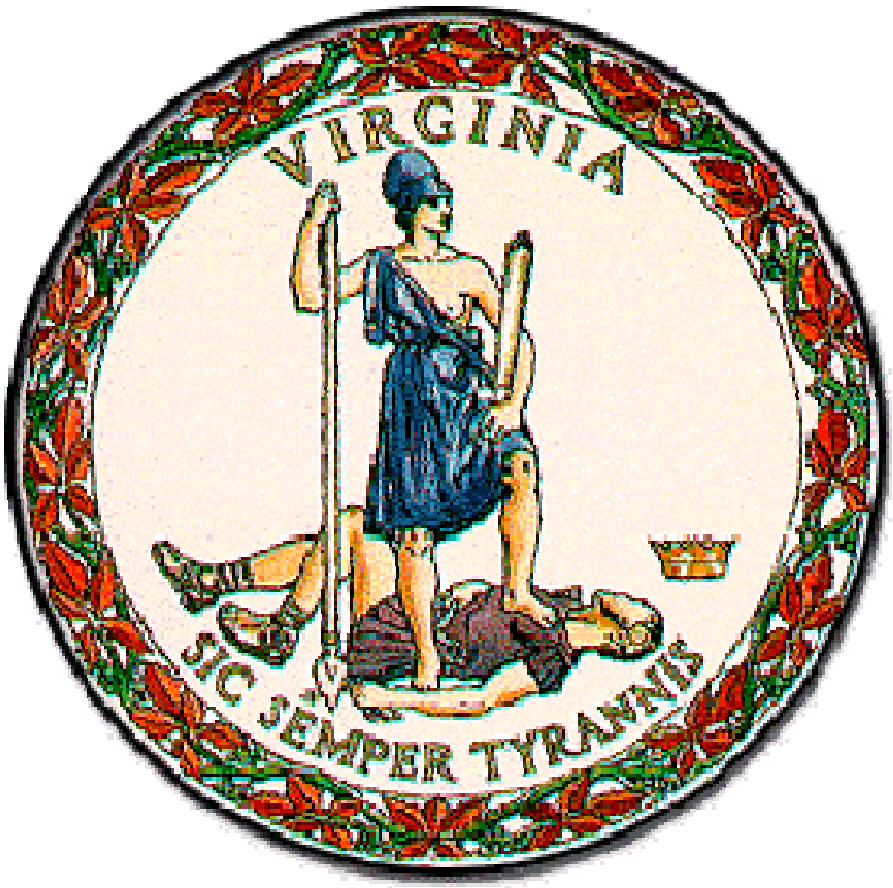
Strategic Plan

Commonwealth of Virginia Health Information Exchange (COV-HIE)

Commonwealth of Virginia



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1 Introduction

The Commonwealth of Virginia's Health Information Exchange (COV-HIE) is a collaborative endeavor, involving public and private stakeholders from across the Commonwealth. Virginia is deeply committed to having the most effective and efficient healthcare available for its citizenry: the ultimate goal of the COV-HIE is to utilize health information technology to improve health care and the health of all Virginians. Much has been accomplished in laying the foundation for Health Information Technology (HIT) and Health Information Exchange (HIE) in recent years – a period of intense planning, policy, and program development in HIT in the Commonwealth. Virginia is now widely recognized as a leader in the field of HIT and has implemented a portfolio of strategic projects and programs specifically targeted to identify and address priority health issues within the Commonwealth. At the same time Virginia has been an active participant in national HIT initiatives and collaborations.

Virginia has fostered both medical and administrative data exchange. Virginia is the only state with two participants (MedVirginia and CareSpark) in the Nationwide Health Information Network (NHIN) Trial Implementation. MedVirginia became the first and remains the only HIE in production on the NHIN through its partnership with the Social Security Administration (SSA) to automate the disability determination process, the first production-level exchange through the NHIN-CONNECT gateway. CareSpark is now in the process of implementing the same process with SSA. Additionally, Virginia has strong representation on the Health Information Security and Privacy Collaboration (HISPC), a state and federal-sponsored, multi-year, public-private organization, whose primary mission is to develop tools, services and support to resolve privacy and security interoperability issues between health information organizations (HIO). Virginia was one of only twelve communities in the U.S. selected to participate in the Centers for Medicare & Medicaid Services (CMS) electronic health record (EHR) demonstration. Virginia was recently designated as a Chartered Value Exchange (CVE), one of several initiatives undertaken by the U.S. Department of Health & Human Services (HHS) to implement a vision for health care reform built on four cornerstones, which are:

- An electronically connected system
- Quality measurement and reporting
- Comparable costs
- Incentives for people to choose higher quality and lower costs

With respect to the exchange of administrative data, the Commonwealth has the Virginia Health Exchange Network (VHEN), a privately-run collaboration of involving most Virginia health plans, health systems, hospitals and the state dedicated to lowering transaction costs and improving the efficiency of administrative systems in health care.

Virginia has developed this Strategic Plan for the COV-HIE by garnering stakeholder input and building a collaborative model for a statewide HIE through the Governor's Health Information Technology Advisory Commission (HITAC). HITAC was created by Executive Order 95 in 2009, and was charged with ensuring broad stakeholder engagement and providing guidance to the Governor on the most effective use of American Recovery and Reinvestment Act (ARRA) funds designated for HIT. HITAC is chaired by the Secretary of Health and Human Resources

and enlists a broad range of stakeholders including hospital and insurance executives, clinicians and healthcare professionals, and HIE and privacy experts. With staff leadership and support from the Office of Health Information Technology, the strategic planning process was guided by the following principles:

1. **"Thin" State Layer**: The Commonwealth should only fill gaps that have not been or cannot be filled by private endeavors.
2. **Adhere to National Standards**: Health data should be available across the country in addition to across town. With the guidance of the Virginia Health Information Technology Standards Advisory Committee (HITSAC), established statute to define Health IT standards for the Commonwealth of Virginia, all relevant standards will be incorporated to achieve interoperability.
3. **Leverage Existing Work**: With two of the NHIN HIEs and VHEN's excellent collaborative work in the private sector, the Commonwealth will leverage existing efforts in a statewide expansion.
4. **Enable Access to Data:** When medically relevant data is available at the point of care, everyone wins. Clinicians make better decisions, hospitals avoid errors, payers are not charged for unnecessary care, and patients exhibit better health outcomes. Virginia believes that no consumer should be left behind in the endeavor.
5. **Foster a Business Case**: Sustained exchange requires that the exchange leads to cost savings and participants in health information exchange should be made aware of this inherent financial incentive.

This COV-HIE strategic plan will address the evolution of capabilities supporting HIE, as well progress in the five domains of HIE activity, the role of partners and stakeholders, and high-level project descriptions for planning, implementation, and evaluation.

1.1 Environmental Scan

This section describes Virginia's current state with respect to HIE and utilizes many sources of information, including stakeholder and key informant interviews as well as primary and secondary data collection methods. This section includes an assessment of current HIE capacities that will be leveraged, HIT resources that will be used, and describes relevant collaborative opportunities that already exist in the Commonwealth.

1.1.1 Virginia's Landscape

The Commonwealth is unique in its demographic diversity, and Virginia's population continues to grow and change. It reached 7.77 million in 2008, maintaining the Commonwealth's position as the 12th largest state population in the country. In 2007, among people reporting one race alone, 70 percent were non-Hispanic White, 20 percent were non-Hispanic Black, and five percent were Asian. Compared to the nation, Virginia had a slightly higher proportion of Black or African American population. The proportion of Hispanics in Virginia (6.5%) was significantly lower than the national average (15.1%). The majority of the minority populations in Virginia reside in the three major metropolitan areas of the state. Within Virginia, two

metropolitan areas are clearly much more densely populated and developed than other areas of the state: The Northern region has the largest number of housing units and people per square mile, followed closely by Hampton Roads. In 2000, 73 percent of Virginia's population lived in urban areas, lower than the national average of 79 percent. Urban populations within Virginia are largest in Hampton Roads, with 92 percent, and the Northern Region, with 91 percent. The Southwest and Southside regions had the largest rural populations, at 75 percent and 65 percent respectively. The state's 11 metropolitan areas contained about 86 percent of the total population in 2007 and almost 69 percent of all Virginians lived in just three metropolitan areas: Northern Virginia, Richmond, and Virginia Beach. These three metropolitan areas accounted for more than 83 percent of state population growth from 2000 to 2007. The Commonwealth's 1.12 percent annual growth rate between 2000 and 2008 was 15th highest among states, and higher than the nation's rate of .94 percent.

Virginia's population will also continue to age. About 21.9 percent of all households in 2007 had one or more persons age 65 years and older and 39.4 percent of persons aged 65 years and older had a disability. The average age of the population will continue to increase as the baby boom generation enters retirement age. The population of Virginians age 60 and over will grow from 14.7 percent of the total population in 1990 to almost 25 percent by 2025 when there will be more than 2 million Virginians in this age group. By 2030, nearly one in every five Virginians is projected to be 65 years or older. Some 70 percent of Virginia's seniors today live in metro areas, especially Northern Virginia, Hampton Roads and Richmond. But the localities with the highest proportion of seniors tend to be rural localities, as young people have left or retirees have moved in.

In Virginia today, older adults comprise 11 percent of people receiving Medicaid services yet drive nearly 25 percent of Virginia's total Medicaid spending and 50 percent of Medicaid spending on long-term care services. As the population grows and ages in the next 20 years, many more people will become dependent on Medicare and Medicaid for health insurance coverage.[1]

With respect to health, Virginia is faced with opportunity for improvement. According to the Centers for Disease Control, Virginia ranks 30th among the states for its age-adjusted annual cancer death rate and 29th, for cardiovascular deaths and 35th for stroke and cerebrovascular deaths. In 2007 Virginia's infant mortality rate was the 12th highest in the nation. In 2008, 62% of Virginia adults were obese or overweight. Thirty-one percent of Virginia's children were overweight or obese in 2007 ranking the state 23rd highest in the country. In 2009, Virginia's adult smoking rate of 19 percent was above the national average of 17.9 percent, the 19th highest smoking rate among the states. Eight percent of the population report having diabetes, and nine percent report having asthma. Fourteen percent of the population does not have health insurance coverage, almost nine percent are covered by Medicaid and 12 percent are covered by Medicare. Almost 9% of the population in Virginia resides in a primary care health professional shortage area, lower than the US rate of 11.8%. Almost 12% of Virginians report not being able to see a doctor during the past year because of the cost. [2]

[1] Source: Virginia's Demographic Profile: Population Trends in the Commonwealth retrieved from http://vaperforms.virginia.gov/extras/profileSummary.php July 9, 2010
[2] Source: http://statehealthfacts.org retrieved July 16, 2010

In 2008, Virginians utilized 571 hospital inpatient days and 1,708 hospital outpatient visits per 1,000 population. Virginia has 90 hospitals, a majority of which are acute care general hospitals. Virginia has about 2.3 hospital beds per 1,000 population. A majority of hospitals (72.2%) are non-profit. Four hospitals are government-owned. There are 54 Medicare certified Rural Health Clinics and 22 Federally Qualified Health Centers. Virginia has about 24,091 Nonfederal physicians for a rate of 3.1 per 1,000 population. About 40% of these physicians are primary care providers.

1.1.2 Current HIE capacities and HIT Resources in the Commonwealth

Office of Health IT, The Virginia Department of Health (VDH) has been designated through executive order as the lead agency for HIT in the Commonwealth, and has established an Office of Health IT. One of the main goals of this office is to use information technology to improve health care quality and efficiency through the authorized and secure electronic exchange and use of health information. This office staffs the Health Information Technology Advisory Commission (HITAC), provides guidance to the Governor on HIT issues, and ensures that the efforts of the Commission are aligned with other HIT initiatives in the Commonwealth.

CareSpark was founded in 2005 as part of an overall strategy to improve health outcomes and to reduce inefficiencies in the delivery of health care in the central Appalachian region of Southwest Virginia and East Tennessee. CareSpark has developed a collaborative multi-stakeholder governance structure and diversified funding mechanisms to support adoption and use of certified electronic systems (electronic health records with e-prescribing and clinical decision support) in clinical settings; connectivity and interoperability through a secure, standards-based network that supports regional and national HIE; aggregation and monitoring of data for the purpose of individual and population health improvement; and alignment of financial incentives for patients, providers and purchasers (employers, public and private health plans). With support from local, state and national leaders, CareSpark's system became operational in fall 2008, and houses records for 300,000 patients served by 125 clinicians who currently use the system.

MedVirginia, LLC, established in 2000, is a provider-owned and governed health information organization based in Richmond. Its organizational purpose is to improve quality, safety and efficiency through the use of HIT. At its core is MedVirginia Solution®, a community-based health information exchange (HIE) linking clinical data from physicians, hospitals, labs and pharmacies. In 2006, MedVirginia's HIE became operational, making it among the first "live" HIEs in the U.S. In 2007, MedVirginia was awarded an HHS contract to participate in the Nationwide Health Information Network (NHIN) Trial Implementation. In 2008, MedVirginia's CEO, Michael Matthews was named the state's Convener for the CMS EHR Demonstration as well as Senior Advisor to the Governor's Office of Health IT. Last February, MedVirginia became the first and remains the only HIE in production on the NHIN through its partnership with the Social Security Administration to automate the disability determination process.

The ***Northern Virginia Regional Health Information Organization Inc. (NOVARHIO)*** was established in May 2006. NOVARHIO has broad participation from across northern Virginia including from patient groups, physicians, hospitals and hospital systems, allied health providers, local governments, free clinics, and laboratories, IT system integrators, corporations, pharmacies and universities. NOVARHIO's hospital partners include Inova Health System, Virginia

Hospital Center, Reston Hospital Center, Sentera Potomac Hospital and Prince William Hospital. NOVARHIO's first full-scale pilot project towards establishing a comprehensive health information exchange is underway with a goal to provide Inova Alexandria Emergency Department physicians with patient medication history (with patient permission) to help in diagnosis and in determining treatment during times of medical emergency. Collaborators include Inova Health Systems and GE Healthcare and the first phase of the project has been funded by a grant from the Commonwealth of Virginia. NOVARHIO also is in the process of establishing a standards-based health information framework for automating and providing access to the "File for Life" and PHRs. With the help of public health officials from across Planning District 8, NOVARHIO is extending the File for Life effort through community outreach.

The Virginia Health Exchange Network (VHEN) is a collaboration of Virginia health plans, health systems, hospitals and the Commonwealth dedicated to lowering transaction costs and improving the efficiency of administrative systems in health care. VHEN was convened by the Virginia Association of Health Plans, the Virginia Hospital & Healthcare Association and the Governor's Office of HIT, and operates under a charter that began July 1, 2007. Using the CAQH CORE Phase I operating rules for HIPAA eligibility and benefit transactions, a secure web portal is being developed to connect Virginia's health plans, health systems and state agencies to simplify patient insurance eligibility verification. Health care providers will be able to determine insurance eligibility status, level of benefits and other critical information in real time across multiple health plans, public and private, by using this one portal. Currently, over 90% of health plans in Virginia participate in this initiative. Virginia's providers ultimately will be able to reduce eligibility verification and claims submission requests via phone/fax and query the Medicaid Management Information System (MMIS) to reduce the overall number of self-pay accounts. The network also provides a platform for expansion into other services, including populating health records and financial management. Future plans include identifying a solution to verify patient insurance coverage when it may be unknown or unavailable so that benefits can be accessed more easily. VHEN also will evaluate additional approaches for reducing costs of collection, payment- and approvals, and where justified, engage in further defined, collaborative and measured efforts to streamline health care administration in Virginia. Medicare connectivity is also offered through the system. The VHEN Steering Committee conducted a competitive RFP last year and selected Availity as its first technology partner to achieve the joint health plan and health system objectives outlined above.

CommonwealthRx was launched in 2009 to increase the volume of e-prescribing in Virginia. Its vision is to improve patient safety, quality of care and cost-effectiveness through e-prescribing and medication management. The goal of CommonwealthRx is to increase the use of electronic prescriptions in Virginia by providing the structure to support purchase and meaningful use of eRx and offering ongoing technical support to prescribers. It is led by a steering committee of health care executives, pharmacists, prescribers and others who possess a shared vision of Virginia being one of the nation's top e-prescribing states. The structure of Commonwealth Rx will support purchase and meaningful use of e-prescribing (eRx) and there will be ongoing technical support to prescribers. Commonwealth Rx promotes certified EMR technology and identifies providers' readiness for e-prescribing. These goals fit well with the COV-HIE. The integration of Commonwealth Rx efforts into the COV-HIE will allow the implementation of e-prescribing to its fullest capability and give providers access to pharmacists and experts.

The current status of the program is ongoing and MedVirginia is funding the entire program including the website and consultant. MedVirginia plans to continue the program through the year and beyond, but hopes that this statewide grass roots effort can be taken to the next level through COV-HIE to reach its full potential.

Surescripts, with headquarters in Virginia, has been a long-standing advocate for the advancement of e-prescribing in the Commonwealth and is an active member of CommonwealthRx. Surescripts operates the country's largest e- prescribing network. The Surescripts network connects prescribers to all of the nation's major chain pharmacies (e.g., Walgreens, CVS/pharmacy, Rite Aid, Wal-Mart), many of the nation's leading payers and pharmacy benefits managers (PBMs) such as Aetna, CVS Caremark, Express Scripts, Medco, Wellpoint, as well as over 10,000 independent pharmacies nationwide. In Virginia, over 85 percent of pharmacies (1,214) are connected to prescribers via Surescripts. Surescripts provides key performance metrics for tracking medication management in Virginia. Examples include: 3.49% of prescriptions are electronic and 1.7M requests for prescription benefits were submitted, with a response rate of 72%. Data provided at www.surescripts.com indicates that as of 2008, Virginia ranks 12th in the nation with about 86% of total community pharmacies in the state activated for e-prescribing, an increase of 11% from the previous year.

Advanced Healthcare Directive Registry, a program that will be supported as a reporting service by the COV-HIE's technical infrastructure. The goals of this program parallel those of the COV-HIE. During the 2008 Session of the Virginia General Assembly, legislation was passed that required VDH to establish an Advance Healthcare Directive Registry for its citizens. This legislation also contained provisions that would allow VDH to seek contributions, grants, or incorporate user fees into the program in order to fund the activity. After significant research on suggested business models, VDH chose to follow the guidelines of the Public-Private Educational Facilities and Infrastructure Act of 2002 that allows state agencies a mechanism for reviewing creative project proposals from vendors.

In 2009 VDH awarded the creation and maintenance of the Advance Healthcare Directive Registry to a partnership of two corporations, Unival and Microsoft. This partnership will allow citizens the ability to submit their directive by paper or electronic formats at no charge. It will also facilitate the issuance of access credentials to the citizen. An additional utility will be provided that will allow the citizen to designate what individuals they would like to have immediate access and then facilitate communication with those individuals to notify them of the directive's availability The directives will be stored within the dynamic CRM platform of Microsoft and will therefore be available to provide interoperability with the COV-HIE in the near term.

Virginia Health Information (VHI) developed a pilot exchange system to collect laboratory data and other clinical data from hospitals utilizing the international system of Logical Observation Identifiers Names and Codes (LOINC®); used in transmission of HL7 messages. This information comes from hospitals representing approximately 50% of Virginia's 870,000 plus discharges per year and represents over 15 million distinct tests and test results. VHI has worked with hospitals to convert internal lab test schema to LOINC® codes for electronic reporting.

Virginia Telehealth Network (VTN) reaches out to all healthcare stakeholders. It is very wide in scope; the applications can range from basic to complex. These services include telephone, email

or use of the internet; remote screening, monitoring and diagnostic consultation; digital imaging and distance learning. An advancing technical infrastructure is required to enable optimal distribution of electronic information and services between consumers and clinicians[3]. The Telehealth providers in Virginia are CareSpark, NOVARHIO, Inova Health System, UVA Office of Telemedicine, VCU Health System Clinical Telemedicine, Northern Neck Middle Peninsula Telehealth Consortium, Southwest Virginia Community Health Systems, and Edward Via Virginia College of Osteopathic Medicine[4]. All of these providers are or have the potential to be HIEs that will connect to the COV-HIE.

The ***Office of Telemedicine at the University of Virginia Medical Center*** connects providers to consumers who are geographically remote. This office enables UVA health professionals to reach out to all the citizens of the Commonwealth. The 60 site network uses advanced computer applications and broadband telecommunications technologies to securely bring UVA specialists to rural communities that may not have access to specialty care. With two way interactive video, a consumer can see and talk to the doctor in Charlottesville, and not have to leave their community. This service is available 24/7 and provides emergency response for several critical clinical scenarios such as stroke. The UVA Telemedicine Network is also utilized to provide professional education classes to providers and health education classes for consumers. UVA's initiative to grant access to specialists by the rural communities matches the COV- HIE's vision to empower providers to make good decisions based on the coordination of care.

Health Information Technology Advisory Commission (HITAC), Virginia took an important step towards the development and implementation of a comprehensive plan for HIT when Governor Mark Warner established the Governor's Task Force on Information Technology in Health Care in 2005. Governor Kaine continued and expanded Virginia's commitment to advancing HIT in the Commonwealth when he issued Executive Order 29 in 2006, creating the Governor's HIT Council. When the Order expired, the council continued on a voluntary basis as the Health Information Technology Interoperability Advisory Committee (HITIAC). HITAC was created by Executive Order 95 in 2009, and was charged with ensuring broad stakeholder engagement and providing guidance to the Governor on the most effective use of American Recovery and Reinvestment Act (ARRA) funds designated for HIT. HITAC is chaired by the Secretary of Health and Human Resources and enlists a broad range of stakeholders including hospital and insurance executives, physicians and HIE and privacy experts. HITAC was formed to encourage public-private partnerships to increase adoption of electronic health records for physicians in the Commonwealth; provide healthcare stakeholder input to build trust in, and support for a statewide approach to HIE; ensure that an effective model for HIE governance and accountability is in place; examine and define an integrated approach with the Department of Medical Assistance Services (DMAS) and VDH to enable information exchange; support monitoring of provider participation in HIE as required to qualify for Medicaid meaningful use incentives; develop and/or update privacy and security requirements for HIE within and across state borders; encourage and integrate the proliferation of telemedicine activities to support the Virginia healthcare improvement goals; monitor and support the activities of Virginia HIT Regional Extension Center (VHIT REC); and examine other health related issues as appropriate.

[3]Source: http://ehealthvirginia.org/whatistelehealth2.html, retrieved May 24, 2010.
[4]Source: http://ehealthvirginia.org/telehealthproviders.html, retrieved May 25, 2010.

Health Information Technology Standards Advisory Committee (HITSAC) advises state government on the approval of nationally recognized technical and data standards for HIT systems or software pursuant to subdivision 6 of § 2.2-2458 in the Code of Virginia. Four HITSAC members are appointed to the HITAC and HITAC incorporated the guidance of HITSAC in the development of strategic and operation plans for COV-HIE. HITSAC's guiding principles are to (1) develop a blueprint for (HIE) and identify steps to achieving that vision; (2) focus on data requirements for both patient health purposes and public health purposes (research); (3) ensure data is available where it needs to be for the patient, while protecting the patient's privacy and wishes; (4) recognize standards, like Electronic Medical Records (EMR) and Electronic Health Records (EHR) are a utility of HIT, not a competitive advantage; (5) focus on interoperability as a critical success factor; (6) develop and manage close relationships with the federal healthcare initiatives; (7) adopt standards instead of creating new ones; and (8) insure standards have been validated prior to adoption. HITSAC will specify the data and communications standards for the Medicaid Information Technology Architecture (MITA) to-be architecture, and eventually, the data and communications standards specified will be broadly adopted for data exchange across the Commonwealth state agencies. The design will also allow for configurability from state to state.

1.1.3 Public Health Initiatives

Virginia's public health system consists of 119 local health departments organized into 35 local health districts (LHDs). The health districts operate in close partnership with the cities and counties they serve, with cooperative agreements delineating the basic health services to be provided in all jurisdictions and any additional services based on need and available funds. In three localities, Richmond, Arlington and Fairfax, the General Assembly authorized the local governments to manage their own health programs. These locally administered health districts operate under contractual agreements with the state, similar to the cooperative agreements used with the other districts. The State Health Commissioner has appointed a Deputy Commissioner for Community Health Services in the Office of the Commissioner to provide centralized planning, oversight and management of the programs and operations of the health districts.

LHDs utilize WebVision, a VDH-developed application as the centralized patient management system. All local health departments receive immunization information, syndromic surveillance information and notifiable laboratory results in the same manner. Syndromic surveillance data are received in .csv files from hospitals and are processed by ESSENCE.

Virginia utilizes the ***Virginia Immunization Information System (VIIS)*** to track immunizations. This application was developed in Wisconsin under a Center for Disease Control and Prevention grant and is used in 20 states. The on-line system utilizes SNOMED CT, NIP table values (National Immunization Program), CPT, CVX, LOINC, FIPS (Federal Information Processing Standard) and HL7 standards. VIIS is currently exchanging immunization records with the Tennessee Immunization Registry through an agreement and connectivity to CareSpark for nearly 800,000 children ages six and under. Providers will be able to achieve meaningful use prior to statewide implementation of the COV-HIE by connecting to VIIS in 2011.

The ***Division of Consolidated Laboratory Services (DCLS)*** is the state lab**.** DCLS utilizes three laboratory information management systems (LIMS) applications provided by STARLIMS. These three applications manage newborn screening data, clinical testing data and environmental

testing data. Newborn Screening (NBS) LIMS processes 120,000 infant samples annually, screening each for 28 different genetic or metabolic disorders. This LIMS is also used by the Virginia Department of Health (VDH) to monitor and record follow-up treatment for babies that have been diagnosed with a disorder. Test results, along with treatment recommendations, are communicated daily to the VDH follow-up group, pediatricians, hospitals throughout Virginia, and various military bases around the world. The adopted codes for electronic messaging of NBS data include: UCOM, ISO, and ASTM, implementation of LOINC, Enzyme codes, and ICD-9 is currently under development.

Clinical LIMS (Sunrise) is used for managing, processing, and reporting analytical result data for public health. Samples processed in this application include clinical, microbiological, food, biological, chemical, and animal specimens. Results are reported daily to VDH, hospitals, physician offices, various state agencies, Office of the Chief Medical Examiner, and various law enforcement agencies. The vital data managed in this system is used for outbreak management, disease detection and surveillance, pandemic response, emergency response preparation, and response to legal and forensics issues. The Sunrise application is capable of electronic messaging on a statewide and national level, using standard code sets including LOINC, SNOMED, PHIN_VADS, HL7, UCOM, ISO, and ASTM. Standard messaging formats include HL7 v2.3.1 and HL7 v 2.5 administered through the Orion Rhapsody message broker.

Environmental LIMS (ENVLIMS) is a repository for the analysis of drinking water for the Virginia Office of Drinking Water. This application manages the data from inorganic and organic chemical, radiation, metal, and bacterial contamination analyses. Currently, adopted codes sets for electronic messaging include: NELAC, STORET, SDWIS, UCOM, ISO, and ASTM. ENVLIMS uses standard messaging formats (i.e. EPA's SDWIS XML schema 2.0). Partner entities are VDH, Virginia Department of Agriculture and Consumer Services (VDACS), Department of Environmental Quality (DEQ), law enforcement, Environmental Protection Agency (EPA), Department of Homeland Security (DHS) and the Food and Drug Administration (FDA).

DCLS's current messaging capabilities for inbound, non-HL7 messaging from VDH include daily electronic lab orders from local health departments throughout the state, outbreak alert notifications and HIV incident reporting. Outbound, non-HL7 messages to VDH includes newborn screening data, Tuberculosis control information, rabies, HIV screening and incident reporting, blood lead, arbovirus, and drinking water results to Office of Water Programs. HL7 messages to VDH include influenza (Newly converted to HL7 2.5). Outbound messages to CDC includes: enteric testing data (Non-HL7), rabies (Non-HL7) and influenza results (HL7 2.3.1).

DCLS has several messaging projects that are currently in progress including Electronic Test Orders and Results (HL7 2.6) State-to-State and State-to-CDC in support of surge, pandemic, and emergency response (ETOR pilot project). The pilot project includes: H1N1 influenza, *Salmonella* spp., and *Bacillus anthracis* inbound data exchanges. Electronic Lab Reporting (HL7) to VDH's National Electronic Disease Surveillance System (NEDDS) is also on-going. DCLS is partnering with Augusta Regional and Inova hospitals to pilot HL7 Newborn Screening results (HL7). They also plan to transmit electronic test results to VDH for lab orders placed by local health departments using WebVision (Non-HL7).

With respect to private lab reporting, LabCorp and Mayo are currently submitting test results electronically to VDH for reportable diseases. The next private labs expected to begin electronic result reporting will include ARUP, Quest (Chantilly), Faquier Hospital and one of the major hospital systems such as Sentara, Inova, HCA, VCU/MCV, UVA, or Carilion. Preliminary talks have already begun with ARUP, Quest (Chantilly), and Faquier Hospital.

1.1.4 HIE Readiness

The Commonwealth has conducted several environmental scans (e-scans) to assess HIT adoption and penetration n the state. In April 2005, Governor Mark Warner issued Executive Directive 6 (ED 6) creating the Governor's Task Force on Information Technology in Health Care charged with conducting a one-year study to advise the Governor and the General Assembly on the current status of Virginia's proliferation of electronic health records. The Electronic Health Record (EHR) was identified as a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting, including patient demographics, progress notes, problem lists, vital signs, past medical history, review of systems, immunizations, laboratory data, radiology reports, and other components of medical records.

Barriers to the overall state adoption rate were seen most clearly in the physician offices, particularly in small offices, as only one-third of health care providers reported using an EHR. Providers in a hospital setting (60%) were more likely than those in large group or small group practice to have an EHR. This suggested a need for greater support for practices, particularly smaller ones. Given that physicians in small practices account for 88% of all outpatient visits and four-fifths of physicians work in small practices, this group represented a sizable adoption gap. Cost was mentioned by one-third of respondents as the biggest barrier to adopting an EHR.

A follow up e-scan was conducted in August 2009 to assess progress in HIT adoption and implementation. 44% of providers reported using an EHR – up from 33% four years prior. EHR components included: lab results, lab ordering, prescriptions, progress notes, decision support material, image viewing, image ordering, alerts to drug interactions, alerts to deviations from protocol, record transmitting/receiving, and patient access to records. Just as before, providers in a hospital setting (60%) and those in large group practices were more likely than those in a small group practice to have an EHR. Cost was mentioned by almost half respondents as being the biggest barrier to adopting an EHR system.

The most recent environmental scan effort was conducted jointly with the state Medicaid agency in June 2010; with input from HITAC members, the Virginia HIT Regional Extension Center (VHIT REC) and the Secretary of Technology to address HIE penetration, adoption and broadband availability. This collaborative process resulted in the creation of separate e-scan tools. One tool was targeted towards hospitals and their practices; a second was targeted for Health Maintenance Organizations (HMOs); a third was targeted toward practices of all types.

Consistent with previous e-scans, a vast majority (78%) of hospitals and health systems reported using Electronic Medical Records (EMR). Most hospitals and health systems report being connected to pharmacies, labs and other hospitals, and about half are connected to other clinics, emergency departments, and digital radiology. A majority of EMRs are implemented in acute care and specialty inpatient units. Hospitals and health systems reported that most of their owned or closely affiliated physician practices have EMR systems that are compatible with the health

system or hospital's EMR. Major EMR functionalities reported include: medical history and testing result retrieval consultation reports, clinical documentation, discharge planning, problem lists, and physician order entry. Almost every hospital surveyed reported the intention of seeking funding for an EHR under ARRA, and the hospitals also plan to encourage providers in their network to apply for stimulus incentives under Medicaid or Medicare. Only 11% of hospitals are actively participating in an HIE, however; more than half plan to connect to an HIE within the next 2 years.

Virginia's Community Service Boards (CSBs) serve as the point of entry into the publicly-funded system of services for mental health, intellectual disability, and substance abuse. There are 40 locally-run CSBs throughout the Commonwealth. A majority of these providers (64%) utilize EHRs within their organizations. The main functionalities for these EHRs are clinical documentation, problem lists, medication lists, and patient consents. Only two CSBs reported using e-prescribing, and only one CSB currently participates in HIE with other provider facilities.

Unfortunately, neither the Managed Care Organization (MCO) nor the provider survey was able to supply meaningful results with the number of responses received. To address this shortcoming, plans are being made to coordinate with the Commonwealth's broadband initiative. This initiative is to undertake a revised provider scan coordinated with the Secretary of Technology to assess both broadband adoption as well as EMR adoption as part of the first phase of implementation of the COV-HIE. This survey is scheduled for implementation in the late summer/early fall 2010.

Given the diversity of Virginia's population, it will be critical to the COV-HIE's success among its healthcare consumers and patients to conduct an environmental scan of consumers to capture variances in desires and attitudes towards HIT and HIE across different population groups and to have that data feed into the governance and operations of the COV-HIE. Some initial thought was put into this environmental scan (a draft questionnaire is included as **Appendix B)** but unfortunately there was not enough time to conduct the e-scan during the planning period, instead it will be conducted during the initial implementation phases.

In summary, a great deal of progress has been made with respect to the development and implementation of HIE in Virginia. Several geographic areas, mainly in the Hampton Roads area, the southeastern portions of the state, and other rural areas along the north western border are lacking in HIE capability. There is also a noticeable lack of interoperability between military and civilian health care providers with respect to HIT. A noticeable gap in information exists with respect the percent of clinical labs (excluding the state lab and the larger chain labs) able to send results electronically. Much work remains to be done in the area of public health reporting, including the ability to exchange immunizations, syndromic surveillance information, and notifiable disease reports electronically. Public health interests will be well-represented moving forward. The Office of HIT resides at VDH, the Commissioner is an active member of HITAC and the Division of Epidemiology in VDH has an active participant on the PHII initiative to define meaningful use for public health informatics. Virginia will continue to take steps to address other shortcomings as COV-HIE moves forward into the operational phase. Many of the collaborative opportunities that will address these gaps are described in future sections of the

strategic plan, including Medicaid coordination, coordination with Federally-funded State based programs, and coordination with the Federal health care delivery systems.

Looking at the variety of both public and private sector health IT related initiatives across the Commonwealth (and their various stages of implementation, HITAC was faced with the difficult task of envisioning a statewide coordination vehicle for all these initiatives that made sense from both a business and technology perspective for today's needs and the future of health IT in the Commonwealth.

1.2 HIE Development and Adoption

Citizens, leaders and stakeholder organizations in the Commonwealth of Virginia share a common vision for the COV-HIE:

That consumers and providers of health services are empowered to make good decisions based on secure, timely, accurate, comprehensive and easily-accessible information, available to authorized users for coordination of care, improvements in safety and quality, and advancements in the provision of healthcare.

This vision was defined and articulated through a consensus-driven process which was facilitated by members of the HITAC Communications Committee. Public input was solicited via public comment at committee and commission meetings, as well as via the project website, before being integrated into a statement that was reviewed and approved by the members of HITAC.

During this same process, the following mission was developed and adopted for the COV-HIE:

To foster and sustain trust, collaboration and information-sharing among consumers, providers and purchasers of healthcare services in the Commonwealth of Virginia, leading to measurable improvement in outcomes and cost-effective delivery of services.

This mission and vision will be publicly communicated throughout the course of planning and implementation, via website, print materials and presentations of HITAC and partnering stakeholder organizations, to increase awareness, support and engagement for the effort.

The Commonwealth of Virginia's overall strategy for developing and increasing adoption of health information exchange within and outside its borders relies on several principles:

1. Building upon existing private sector and public sector efforts with a minimal amount of duplicative effort both from a manpower and technology perspective.
2. Coordinating project timelines for health information technology related projects across all Commonwealth state agencies and pooling resources and implementation approaches whenever applicable.
3. Utilizing a combination of approaches (grassroots and top-down) across the stakeholder landscape to solicit input and outcomes information for continuous improvement of health information exchange policies and procedures over the course of the implementation.

After much deliberation, HITAC has made the following recommendation as to the overall strategic implementation approach for the COV-HIE:

Allow any HIE that meets the HIE certification requirements to compete in a free market across the Commonwealth, supplying their exchange services to any interested healthcare provider.

This model includes an approach of "HIE certification" based on a set of HIE requirements. An HIE must first go through a certification process where their compliance with the COV-HIE standards are tested and verified, and then upon successful certification they will be authorized to operate as a COV-HIE certified HIE on the COV-HIE. These COV-HIE certified HIEs do not need to be HIEs in the traditional sense (such as CareSpark, MedVirginia and NOVARHIO), but could also be other entities, such as Integrated Delivery Networks (IDNs). Commonwealth state agencies that handle health-related data or healthcare delivery are also expected to participate. Any healthcare data provider that wishes to interoperate directly at the state level could be COV-HIE certified and authorized to be an HIE on the COV-HIE.

The primary business advantages that led HITAC to select this model are the following:

- This model is aligned with Commonwealth principles of free market competition. Other potential models evaluated could have been construed as attempting to establish geographic monopolies for a statewide utility.
- This model is aligned with Federal (ONC) principles of complementing current private and public sector HIE efforts in the state without significant rework, and also to support the exchange (but not necessarily provide a direct capability by the Commonwealth to end users) of the following types of data to support meaningful use of health IT requirements for providers:
  - E-Prescribing
  - Lab Results
  - Claims and Eligibility Checking
  - Quality and Immunization Reporting
- This model allows for the addition of future connections and business entities not currently in existence without major perturbations to the technical or operational models.

On the implementation level, HITAC has outlined the following high level implementation guidelines for this model. These are described in detail in Sections 2.3-2.4.

1. The COV-HIE will establish a certification and authorization process to evaluate potential "COV-HIE certified HIEs" on the COV-HIE network. As noted previously, these COV-HIE certified HIEs need not be HIEs in the traditional sense (i.e. CareSpark, MedVirginia, NOVARHIO), but may be also Integrated Delivery Networks, and Commonwealth state agencies that handle health-related data or healthcare delivery. Essentially any healthcare data provider that wishes to

interoperate directly at the state level could be certified and authorized to be a COV-HIE certified HIE.

2. The COV-HIE will establish a standardized gateway for access to all state health related resources (e.g. Immunization Registry, Advance Directive Network, public health reporting, etc). The standardized gateway will also maintain a connection to the NHIN and be upgraded appropriately over time to take into account evolving NHIN standards and policies, which would automatically provide bidirectional access between the COV-HIE and other Federal agencies participating in the NHIN (i.e. DoD, VA, HIS, etc)
3. The COV-HIE will operate several centralized technical and functional services: primarily to provide aggregation where necessary and access to state-managed repositories of health data that no other HIE can access.
4. HIEs that wish to be certified and authorized on the COV-HIE will need to implement a set of standard technical and functional services. COV-HIE certified HIEs will be expected to provide certain mandatory services such as Transaction Auditing and Security Services, but also non-mandatory services such as a PHR based personal health record available to the consumer, or a chronic disease management service. These non-mandatory services will act as business differentiators for COV-HIE certified HIEs as they compete in the market to sign up more data providers.
5. There will be instances where there are overlapping services provided by the COV-HIE and its individual certified HIEs. Given the principle that COV-HIE certified HIEs have a choice, over time they may choose to use the service provided by the COV-HIE as opposed to maintaining their own version of the service (i.e. NHIN gateway, MPI, record locator service) in a way that best suits their evolving technical, business, and functional needs.
6. Additional private and public sector efforts will have the freedom to choose to enroll with any HIE that is certified and authorized to operate on the COV-HIE.

1.2.1 COV-HIE Strategy

The COV-HIE comprehensive strategic initiative must involve all the current public and private sector efforts in HIE and HIT referenced above, and the future COV-HIE stakeholders identified in the following diagram.

Figure 1: COV-HIE To-Be Participants

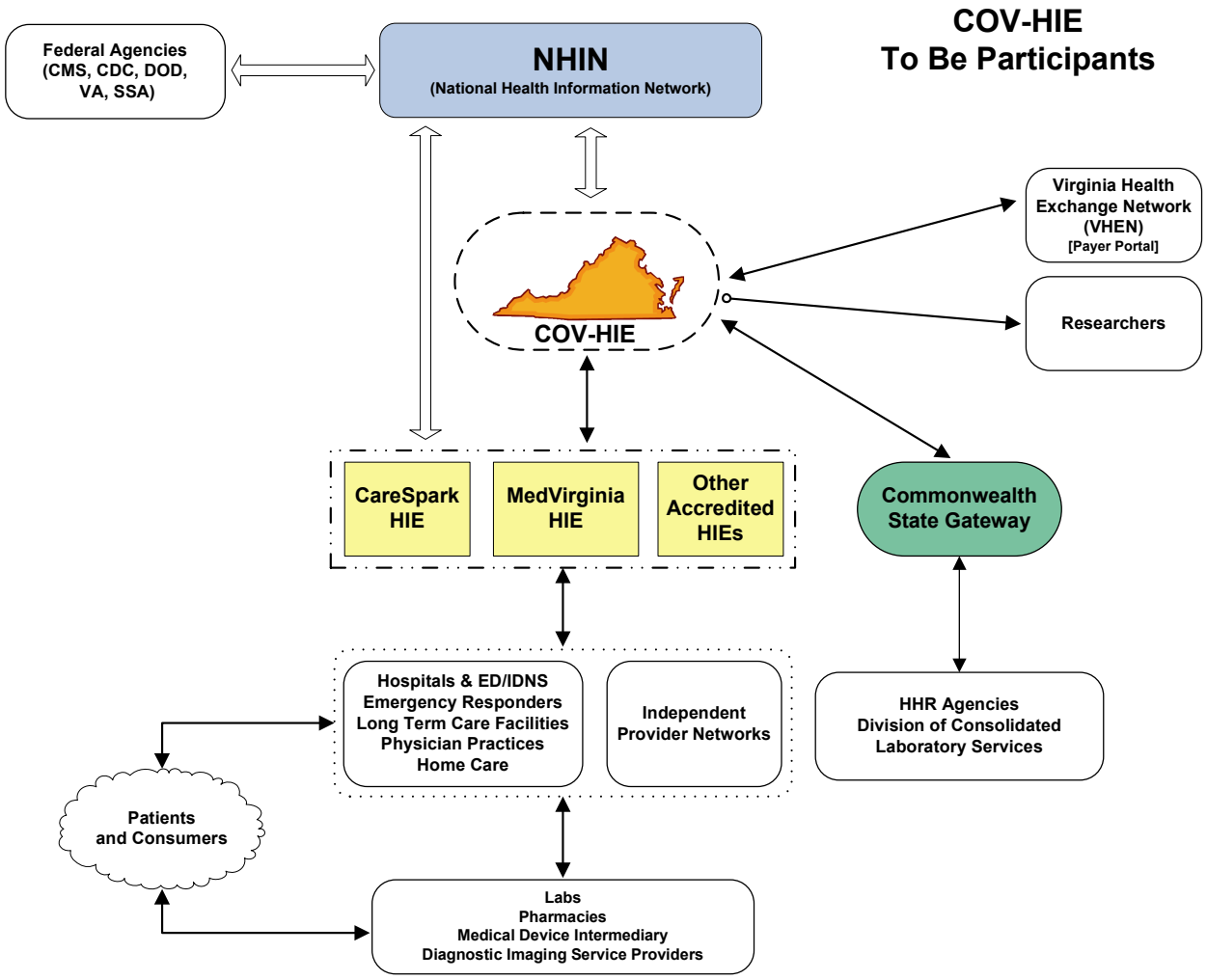


Figure 2 depicts the envisioned COV-HIE Conceptual Architecture that connects all the potential stakeholders. The guiding principles for the architecture were:

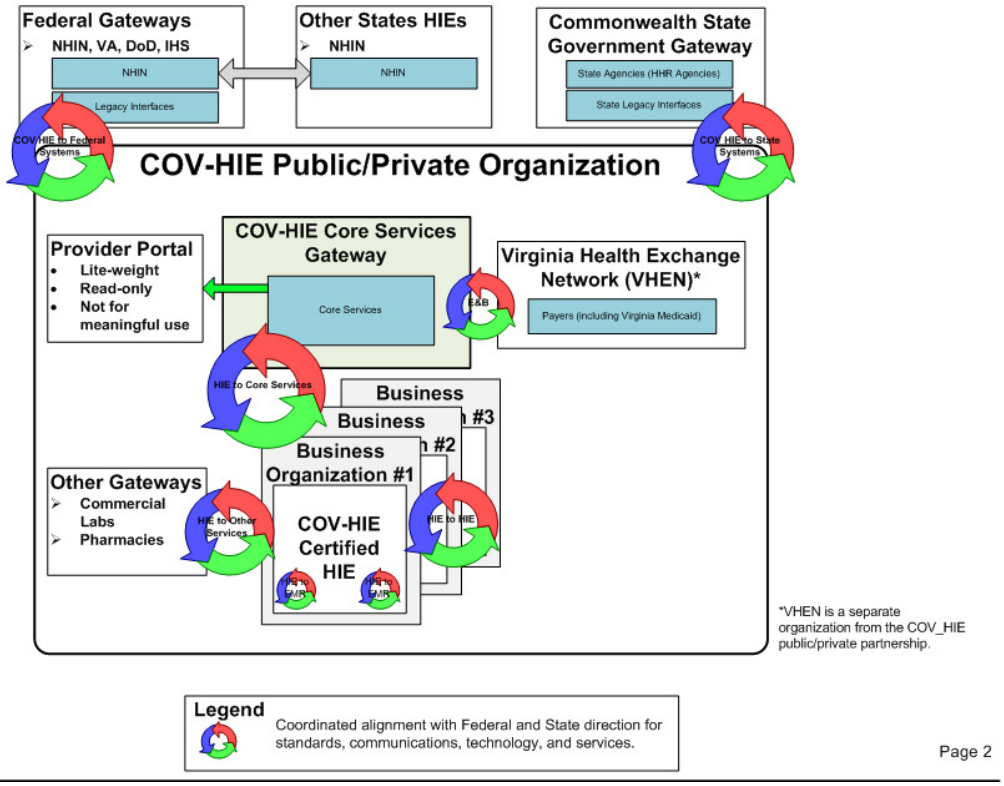
1. Coexist with private sector efforts
2. Leverage existing HIT within Virginia
3. Promote cost-effective operations

Accordingly, the key features of the selected architecture include:

1. Establishing COV-HIE governance and operations via contracting.
2. Aligning statewide efforts with State and Federal direction for standards, communications, technology, and technology services to facility information sharing and semantic interoperability.

3. Promoting a network of networks concept to leverage existing HIT and allow for multiple COV-HIE certified HIEs.
4. Implementing a COV-HIE Core Services Gateway that offers core statewide services exclusively to COV-HIE certified HIEs. Core statewide services will not be available directly to providers, consumers, or to the public.
5. Creating a certification program for Virginia HIEs that identifies harmonized standards, communications, technology, and technology services for interfacing with COV-HIE Core Services, other COV-HIE certified HIEs, as well as the Commonwealth State Government gateway. Certification, once earned, implies that the organization becomes an accepted trading partner and can interface with other COV-HIE certified HIEs as well as state and federal government systems and networks in a standard and semantically meaningful way. It also implies the basic service packages made to providers are the same so providers can compare listed prices for HIE basic service packages. COV-HIE certified HIEs are also free to offer value-added services and features to their clients and stakeholders beyond the basic required service packages.

To-Be Conceptual Architecture



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1.3 HIT Adoption

Early in the planning process, stakeholders were engaged to inventory existing programs in the state responsible for promoting, delivering or supporting the adoption and use of health information technology and health information exchange. The following programs and activities were identified to better determine the statewide readiness for participation in health information exchange.

Many stakeholders involved in the strategic planning process are spearheading adoption efforts internal and external to their organizations, in coordination with state-level activities, including:

- Community Care Network of Virginia, the statewide health center controlled network for federally-qualified health centers.
- Integrated Delivery Networks (Bon Secours, Carilion, Centra Health, Inova Health, LifePoint, Sentara, etc) which directly or indirectly support various EHR solutions to affiliated providers.
- MedVirginia and CareSpark, both mature health information exchange organizations, offer services and support for standards-based interoperability and exchange within their defined geographic coverage areas and outside through their NHIN gateways.
- NOVARHIO and other health information exchange organizations currently under development.
- Virginia Health Quality Center, the Quality Improvement Organizations (QIO) contractor to CMS, is also contracted to serve as Virginia's Regional Extension Center for Health Information Technology. The mission of the VHIT Regional Extension Center is to provide comprehensive, low-cost technical assistance to make it easier for the Commonwealth's priority primary care providers (PPCPs) to adopt electronic health records (EHRs), integrate them into the patient care process, and attain meaningful use. VHIT will provide assistance in two areas: to assist in new EHR implementations with the goal of meaningful use; and to assist existing EHR implementations to attain meaningful use. VHIT's goal is to bring 2,285 PPCPs to "meaningful use" of EHR within two years. VHIT has hired its initial staff and begun the awareness and physician enrollment campaign. In these stages of outreach, VHIT is addressing both individual providers, provider groups and numerous statewide medical organizations. Regional EHR solution partner "kick-off" meetings are being held around the state in June/July 2010 as well as webinars, exhibits and other venues for campaign material distribution. VHIT is providing a choice of three EHR solution partners (Allscripts, MDLand, and Athena Health) with well negotiated group pricing discounts, and assistance with training and implementation. Currently VHIT is developing a continuum of services to assist physician practices in achieving meaningful use. In the early phase of a provider going "live", several aspects of meaningful use will be pursued, including electronic prescribing and clinical data reporting. Virginia providers will benefit from VHIT services even after the initial EHR go-live as VHIT staff will continue to work with them to ensure they achieve full meaningful use of their EHR systems.
- Virginia Health Information Management and Systems Society (HIMSS), which sponsors annual and other conferences for networking and dissemination of information and best practices related to health information technology.

- The Medical Society of Virginia (MSV) has developed a three-year strategy to spur the adoption and successful implementation of health information technology (HIT) by Virginia's physicians in a way that effectively integrates the added functionality of HIT into patient care. MSV is working to ensure that Virginia's physicians are prepared to achieve meaningful use of certified electronic health records, and are developing educational programs and resources that will help guide physicians on the journey towards HIT adoption and implementation. In addition, MSV's preferred vendor program (MSV HIT Select) will require participating EHR vendors to adhere to contract guidelines that enhance provider use of HIT and promote interoperability and meaningful use.
- The Virginia Hospital & Healthcare Association (VHHA)
- The Virginia Association of Health Plans (VAHP)
- The National Patient Advocate Foundation (NPAF)

Each of these organizations will be invited to continue their participation in the implementation of the proposed plan. They will be engaged to help develop, disseminate and evaluate activities and materials that aim to increase adoption of health information technology, participation in health information exchange and meaningful use of information to achieve improved health outcomes.

1.4 Medicaid Coordination

Because of the importance of Virginia Medicaid in setting state level HIT policy, Virginia has closely coordinated strategic planning activities with this state agency. Virginia Medicaid has participated with HITAC and assorted committees to coordinate strategic and operational planning for the COV-HIE. As noted earlier, the Office of Health IT and Virginia Medicaid conducted a joint e-scan during the strategic planning process. Virginia Medicaid has been involved in Virginia HIT REC planning activities as well. Virginia Medicaid will also partner in the upcoming broadband e-scan to be conducted by the Secretary of Technology and the Office of HIT.

Virginia Medicaid's State Medicaid HIT Plan (SMHP) describes how Virginia Medicaid intends to implement and promote Health IT, especially in light of meaningful use requirements as defined by CMS. Intense collaboration and cooperation have been important factors for SMHP development. The SMHP project office is the VDH Office of Health IT. The SMHP project team includes a number of Medicaid divisions, HITAC and Virginia HIT REC members that participate as part of the provider incentive program team for the project. The SMHP consists of as-is and to-be road map sections that directly relate to the COV-HIE strategic plan. Finally, the SMHP will be provided for review and comment to HITAC.

Information is currently flowing from Virginia's SMHP effort to the HIE and VHIT REC efforts on the National Level Repository (NLR) that will be used to track incentive payments to health care providers that adopt electronic health records and modernize their computer systems registration process. In addition, Virginia Medicaid has posted an information site (http://www.dmas.virginia.gov/pr-incv.htm) and provided a capability for email questions. This site also describes Virginia HIT REC activities to assist providers in adopting, upgrading, and EHR and/or attaining or exceeding meaningful use of certified EHR and links to VDH's Office of HIT.

Medicaid Information Technology Architecture (MITA) is national framework supporting improved systems development and health care management for the Medicaid enterprise. The MITA technical architecture standards is the basis of the of the technical architecture standards for COV-HIE. The proposed technical architecture for the COV-HIE is a services oriented architecture (SOA) based framework. The envisioned Commonwealth State Government Gateway is based on the MITA technical architecture standard, and existing Virginia system assets will need to exchange information with the COV-HIE using SOA technology in the future.

The COV- HIE is planning to leverage MITA as part of a broader effort to reorient essential state services to a citizen-centric paradigm. The effort will start with an HHR secretariat-wide MITA State Self Assessment (SS-A) to align business strategy and direction. Based on the resulting updates to the MITA Transition plan, additional projects will start to transform the MITA Care Management and Member Management business area towards MITA's concept of operation for citizen-centric services. Other State programs will seek support from their applicable Federal partners to follow the MITA initiatives and begin their own transformation to SOA, standards, and a citizen-centric paradigm. The key to the business and technical transformation the COV-HIE wants to achieve is based on standards. The SOA technology components are based on industry standards (refer to Appendix A Services Matrix, 6.3 Technical Infrastructure service for references). Information standards used on the COV-HIE SOA are paramount; accordingly, the HIT Standards Advisory Committee (HITSAC) will be chartered to harmonize industry standards for the HHR Agencies just as it did for the COV-HIE. This harmonization will ensure future capabilities to exchange information throughout the delivery of care.

Virginia Medicaid participates as part of the VHEN organization (payer portal) available to all Virginia providers for eligibility (member registry) and for claims payments that includes coordination of benefits (COB). These functions are handled within the Virginia Medicaid Enterprise (MMIS is one component in the enterprise) by registering VHEN both as an eligibility vendor and a claims clearinghouse. In addition, the Medicaid Quality of Care (QoC) reports will be sent via COV-HIE Services Operations to the to-be Commonwealth services oriented architecture (SOA) based interface for the QoC repository. Finally, Virginia Medicaid will be a client of the COV-HIE using a light-weight EMR for professional medical staff needs (service authorizations and appeals) as well as one source of Medicaid provider meaningful use statistics.

For Medicaid, these efforts are targeted to avoid significant increases in administrative and operational support that would be necessary for an expansion of Medicaid under the Health Reform act. However, for the COV-HIE, it will establish broad standards-based capabilities to coordinate and orchestrate future consumer services as well as share and exchange health related information between provider networks and the Commonwealth that is far beyond current capabilities

The proposed governance structure of COV-HIE (described later) includes representation of Virginia Medicaid.

1.5 Coordination of Medicare and Federally Funded, State Programs

In addition to Virginia Medicaid, the following programs in the Commonwealth will all be participants in the COV-HIE. Some of these programs will connect directly to the COV-HIE, others through an existing HIE, and others will pass data or attain data through the COV-HIE.

The coordination of these programs and COV-HIE will elicit the best health care for Virginia citizens.

Virginia currently has 25 Federally Qualified Health Centers (FQHCs) operating in the Commonwealth. In 1994, these FQHCs formed a health center controlled network called Community Care Network of Virginia (CCNV) which provides the vehicle through which Virginia's FQHCs adopt, implement and operate health information technology. As of June 2010, 92% of Virginia's FQHC providers have adopted and implemented electronic health record applications through the support of various Health Resources and Services Administration (HRSA) funded initiatives including High Impact Health Information Technology Implementation funding. CCNV has been actively engaged in the development and planning for Virginia's COV-HIE. Its Chief Executive Officer is an appointed member of HITAC and is a member of the State Medicaid Agency's Task Force for Health IT. CCNV is a collaborating partner with the Virginia HIT Regional Extension Center, and actively supports the two operating NHINs in Virginia (MedVirginia and CareSpark). CCNV's own strategic agenda includes a significant emphasis on health outcomes improvement and health information exchange. It is anticipated that the FQHCs will connect to the COV-HIE either directly as an COV-HIE certified HIE or through an existing COV-HIE certified HIE once the COV-HIE is operating.

The behavioral health community will also be an active participant and contributor in the COV-HIE, especially through a project currently in development through the Department of Behavioral Health and Developmental Services (DBHDS). The project is a Medication Management System that will centralize medication lists for mental health hospitals, a safety measure to address negative drug interactions. The project has been delayed a year and has just recently resolved all infrastructure issues. Training is currently taking place and a pilot phase will roll out to the hospitals in a few months. A Medication Management System is a potential data provider to the COV-HIE if a consumer consents to have their data shared or transferred. This can be done so through the COV-HIE and the consumer's medication records will be accessible to other providers as long as the consumer wishes.

1.6 Participation with Federal Care Delivery Organizations

There have also been various public and private sector efforts in the Commonwealth that directly participate with other Federal healthcare delivery organizations. These efforts will be leveraged in the approach and sequencing of implementation activities of the COV-HIE.

1.6.1 Other Federal Coordination

Centers for Disease Control and Prevention (CDC), One program that will be an integral part of the core services offered through the COV-HIE and will have ties to a federal agency will be a disease reporting effort through the Division of Consolidated Laboratory Services (DCLS). This initiative will fall under reporting services and may be a large part in the state's mandated reporting. On April 19, 2010, DCLS applied for funding under the "Epidemiology and Laboratory Capacity for Infectious Diseases Cooperative Agreement" known as the ELC Program (Funding Opportunity: CDC-RFA-CI10-1007ARRA10) to enhance and advance infrastructure and interoperability support for public health laboratories (PHLs) so they can satisfy Stage 1 Meaningful Use (MU) criteria. DCLS's goal is to work with a pilot group of

hospitals to develop standards based messaging and a workflow for reporting notifiable disease data to hospitals, clinicians, the Virginia Department of Health (VDH). The workflow for reporting communicable disease information is comprised of three components. The first component is the Electronic Test Order sent from the Hospital Lab through the Electronic Health Record (EHR) system to the State Public Health Lab (SPHL). The second component is the Test Results reported from the SPHL's Laboratory Information Management System (LIMS) to the Hospital EHR and then to the Hospital Lab. The third component involves the reporting of national and state notifiable disease information from the Hospital EHR/lab system to VDH and CDC.

COV-HIE, UVA Health System, VCU Health System, Sentara and VDH are stakeholders of DCLS and all wrote letters of support for DCLS's proposal for the ELC Program. Awards are expected in the August 2010 timeframe. This initiative will help to forge the relationship with the hospital community, lay the ground work for meaningful use for electronic lab orders and test results using standards based messaging, and enhance the Commonwealth's overall ability to electronically report nationally notifiable disease data, enhance surveillance, detection, and containment capabilities, and improve overall patient care. All deliverables should be completed and a steady stream of reportable disease data flowing from DCLS to hospital partners, VDH, and CDC using standards based messaging, within 24 months.

Center for Medicare and Medicaid Services (CMS), CareSpark is now engaged with CMS to develop and test specifications for physician reporting of quality measures (PQRI) directly from their EHR systems through an HIE / NHIN gateway in a standardized format, and to receive feedback reports on an interim and final basis verifying their qualifications for receipt of incentives payments for Meaningful Use. This project was initiated in June 2010 and is targeted for completion before the 1st quarter of 2011, allowing for demonstration and publication of standard specifications for use by others across the country.

1.6.2 Optional Federal Coordination

Social Security Administration (SSA), As the nation's primary disability benefit provider, SSA is among the largest users of medical record information in the United States, specifically for disability benefit determination. SSA and MedVirginia collaborated to use the NHIN as a secure and interoperable transport environment for patient information. This project represented the very first production exchange of health information across the NHIN. SSA and MedVirginia began requesting and receiving actual patient information across the NHIN in 2009 and the production effort remains operational. Several months after they were in production, MedVirginia changed from their initial proprietary gateway to the newly released Federal Health Architecture (FHA) developed open source CONNECT gateway. This change was due in part to evolving Health IT standards and MedVirginia's belief that the gateway change would prove to be a more sustainable model for the future. The second major challenge involved identifying an existing technical standard that would accommodate both the placement of the authorization and the image of the authorization. In terms of technical success, the authorized medical evidence request and receipt took approximately 2 minutes, including Continuity of Care Document (CCD) rendering, resulting in a mean case processing time savings of 42% as compared to the

Virginia Disability Determination Service (DDS) state average. Moving forward, Virginia seeks to exchange health information via the NHIN, using the experience of MedVirginia, to benefit from using the CONNECT gateway. For example, Centra and others are currently working with MedVirgina to exchange records with SSA via the NHIN using this model.

CareSpark also has a similar project effort working with SSA that is currently in the process of implementation.

Veterans Administration (VA) and the Department of Defense (DOD), The Veteran's Lifetime Electronic Record (VLER) initiative will allow medical and other information for the U.S. military personnel to flow seamlessly from active to veteran status. This is a step in improving the delivery of care and service for servicemen and women as they transition from military to civilian life. Both administrative and medical data will be included in the electronic medical record and will begin the day the recruit enters military service and will continue after they leave or retire from the military[5]. MedVirginia has been contracted by the VA and the Department of Defense DOD to provide connectivity to the civilian healthcare providers in Hampton Roads. The exchange is scheduled go live on July 30, 2010 and will be implemented on a limited production basis and utilizing only Continuity of Care Documents (CCDs) in the C-32 format. The VLER program is connected to NHIN, through which the COV-HIE will have access. When a search is done for a consumer through the COV-HIE the veteran records will automatically be searched as well through the NHIN.

1.7 Coordination with other ARRA Programs

There are currently a number of programs (both public and private) within the state that the COV-HIE will coordinate with in varying degrees.

The COV-HIE will work closely with the Virginia Health Information Technology (VHIT) Regional Extension Center program. Coordination of activities with the Virginia HIT Regional Extension Centers will continue as various Regional Extension Center members participate on HITAC and several committees. The Director of HIT is a member of the Regional Extension Center advisory council. One target population for the Regional Extension Centers is FQHCs affiliated physicians. Regional Extension Center outreach will assist these providers in either obtaining EHRs or achieving meaningful use with their existing EHR systems. FQHCs are anticipated to be the first node on the COV-HIE.

National Telecommunications and Information Administration (NTIA), The Recovery Act directed the NTIA to develop and maintain a comprehensive nationwide inventory map of broadband service capability and availability, and to make the map publicly available via the Internet. NTIA awarded monies to Virginia to collect and verify statewide data about the availability, speed, and location of broadband Internet. This data collection is to be conducted on a semi-annual basis over a two-year period, with the data to be presented in a clear and accessible format to the public, government, and the research community.

[5]) Source: http://www.army.mil/-news/2009/04/10/19508-obama-announces-joint-virtual-lifetime-electronic-record/, Retrieved May 25, 2010.

The VDH Office of Health IT is partnering with this initiative to conduct an environmental scan of healthcare providers. This scan will assess the availability of the technical infrastructure that is necessary for a deployment of "meaningful use" electronic health records. With the vast geography of the Commonwealth, Virginia has many rural areas where broadband capability is at a premium. This partnering will illustrate the areas of the state that require immediate attention to supply healthcare providers with the tools necessary for practice improvement.

NTIA will then use the data collected by grantees, in combination with other data sources, to create and publish online the National Broadband Map by February 17, 2011. The map will further educate consumers and businesses about broadband Internet availability, enable broadband Internet providers and investors to make better-informed decisions regarding the use of their private capital for future broadband investment, and inform the decisions of Federal, State, and local policymakers as they work to expand the benefits of broadband to all Americans.

2 Strategy

2.1 Governance

2.1.1 Collaborative Governance Model

Governance for the COV-HIE must reflect the interests of the varied stakeholders that will participate, due to the following facts:

- Virginia providers will receive ARRA incentive funding for becoming meaningful users of certified EHRs.
- The COV-HIE will provide a subset of services that providers need to become meaningful users.
- The COV-HIE will assist in improving the quality and efficiency of healthcare delivered to Virginians.
- There will be multiple stakeholders that benefit from the services provided by the COV-HIE, including consumers and patients.

As a result, the following principles have been adopted that relate to governance of the COV-HIE:

1. The COV-HIE Governance Body will be responsible for accountability and transparency to all stakeholders for COV-HIE activities to both public and private interests and make available performance metrics.
2. The COV-HIE Governance Body will be an ongoing body that has clearly defined rules for representation and order of succession for representation.
3. The COV-HIE Governance Body will have a process for addressing new state and national legislation and guidance and will manage communication with state legislators and other stakeholders.

4. The COV-HIE should NOT be fully publicly funded and will include both public and private sector participation.
5. The COV-HIE will leverage existing HIE activities within the Commonwealth and provide an operational HIE for areas not currently served.
6. Participation in the COV-HIE will be voluntary, not mandatory.
7. The COV-HIE Governance Body will coordinate interstate HIE activities and adjudicate issue resolution with other COV- HIE governance bodies.

The approach taken by the Commonwealth to set up the Governance Body for the COV-HIE is primarily meant to establish a governance structure as quickly as possible while still supporting the principles of governance described above. To ensure that the Commonwealth is presented with the full array of potential governance options, the plan calls for moving ahead this fall with an RFP process to be managed by the Office of Health IT within VDH, with input from the HITAC.

The Virginia Department of Health (VDH), will contract with the successful respondent (once final approval of the Commonwealth's HIE strategic and operational plan is received) to serve as the COV-HIE Governance Body. The contracted Governance Body must have the ability to meet the vision, mission and requirements of the COV-HIE as laid out in the strategic and operational plans.

The contract between VDH and the COV-HIE Governance Body will specify that the Governance Body will perform the following functions for the COV-HIE:

1. Develop and enforce Commonwealth standards (aligned with national standards), policies and agreements for HIEs that apply both to public and private sector entities
2. Develop, administer and maintain an certification process for HIE program and service providers to ensure compliance with Commonwealth of Virginia HIE standards, policies and agreements
3. Authorize HIE program and service providers after the certification process is complete to connect to the COV-HIE network
4. Coordinate integration and use of the COV-HIE amongst other public and private sector health IT related projects within the Commonwealth (i.e. Virginia HIT Regional Extension Center, VHEN, etc)
5. Recommend policy changes as necessary to Commonwealth executive, legislative and judicial branches
6. Determine acceptable uses for the COV-HIE such as consumer care and public health reporting
7. Work with national and regional interstate governance bodies yet to be constituted to represent the Commonwealth and resolve issues of standards harmonization, interstate/national policy, technical interoperability, and applicable current and future federal and state regulations
8. Institute mechanisms for key stakeholder groups (consumers & healthcare consumers, healthcare providers, healthcare purchasers, healthcare policymakers, etc.) to provide feedback on COV-HIE policies, procedures, and operations

9. Maintain and publicly disclose appropriate metrics at regularly determined open public meetings
10. Contract with other vendors to provide necessary additional services to build, maintain and operate the COV-HIE as laid out in the COV-HIE strategic and operational plans.
11. Enforce accountability with vendors contracted to the COV-HIE for meeting designated service metrics and impose penalties as contractually appropriate
12. Determine how the COV-HIE will be represented in dispute resolution
13. Manage and maintain financial sustainability for the COV-HIE by determining and pursuing appropriate funding sources and ensuring continuation of the COV-HIE past the end of ARRA funding
14. Maintain financial and operational accountability to VDH for the duration of the contract period

All Commonwealth state agencies that interact with health data will be required to participate in the COV-HIE. The method of enforcing this participation from state agencies will need to be determined by the Commonwealth and is not in the jurisdiction of the COV-HIE Governance Body The State HIT Coordinator, Commissioner of Health and other designated entities to be determined by the Commonwealth will be members of the COV-HIE Governance Body representing state interests in the COV-HIE. The State HIT Coordinator also acts as the contracting officer for the COV-HIE Governance Body for their activities under contract.

2.1.2 State Government HIT Coordinator

The Office of HIT consists of a director, Kim Barnes, appointed by the Secretary of Health and Human Resources in consultation with the Commissioner of Health and additional professionals as the Secretary determines. Ms. Barnes serves as the Commonwealth's HIT Lead to fulfill the responsibilities outlines in the American Recovery and Reinvestment Act of 2009 (ARRA), supports the work of the Governor's HIT Advisory Commission, facilitates collaboration between the Commission and all appropriate stakeholders, ensures broadband and telemedicine initiatives are integrated into the Commission's planning and implementation process and ensures VDH HIT projects including the Advanced Directive Registry, the Immunization Registry, as well as any future electronic health record initiatives are appropriately aligned with the Commission's planning and aligned with ARRA-funded projects.

2.1.3 Accountability and Transparency

The strategic and operational plans have been developed with an emphasis on accountability and transparency. All HITAC meetings and committee meetings have been conducted under Virginia's Freedom of Information Act (FOIA) guidelines. All meetings have been publicly advertised and open to public participation and comment. All materials have been posted on Virginia's HIT website www.hits.virginia.gov. Moving forward, the same commitment to accountability and transparency will be demonstrated during the operational phase of the COV-HIE.

2.2 Finance

A key issue for the ongoing operation of the COV-HIE is the finance model that will be used for ensuring financial sustainability.

As part of the dialogue to develop a financial sustainability plan linked to stakeholder endorsement, the following Finance Principles were established for the COV-HIE:

1. The COV-HIE should benefit all consumer groups, cost should not prohibit participation, and ultimate output will benefit the consumer.
2. The COV-HIE finance model will present fairness to all stakeholders.
3. The COV-HIE finance model will be a public/private partnership.
4. The COV-HIE finance model will be value based.
5. The COV-HIE finance model will be kept as simple as possible.
6. The COV-HIE finance model will be revisited periodically based on policies and procedures to be developed by the state HIE governance body to ensure appropriate levels of sustainability.

In order to properly implement these principles, Virginia will procure an experienced non-profit HIE/HIO sector partner to implement and operate the COV-HIE Governance Body. Initial funding will come from the $11.6M federal grant from ONC. On-going funding will come from the public and private user base. This funding must be sufficient to cover on-going operational and governance costs when the initial funding ends, as no subsidy is expected from the state.

The previously mentioned purpose of the HIE requires having wide spread participation, which is also key to distributing the costs so they are not burdensome to any individual stakeholder. Since participation in the HIE will be voluntary, the pricing model will not create a barrier to participation.

Strategic and tactical components of the pricing model are described below. The details of the model will be further developed in conjunction with a business plan that encompasses the necessary cost estimates and stakeholder value analyses. The COV-HIE Governance Body will rely on a combination of stakeholder outreach and feedback described in the Communications domain as well as metrics and outcomes analysis from ongoing operations to determine how to refine the business plan over time. The business plan will be updated at an interval to be defined by the COV-HIE governance body and reported on to all stakeholders in a method and interval to be defined by the COV-HIE governance body.

The following statements capture the finance strategy to be utilized in the implementation of the COV-HIE. The bullet points below each statement describe the tactics that will guide the COV-HIE in achieving the strategy.

Use all available funding sources.

- Use federal and state funds to develop the system and start operations.
- Augment with subscription pricing for services as soon as services are offered.
- Consider annual (e.g., membership) and one-time (e.g., certification) fees for healthcare entities certified as nodes on the COV-HIE network. The COV-HIE business model will accept all healthcare entities that meet the certification criteria (i.e. traditional regional HIEs, integrated delivery networks, large physician practices with their own EMR systems, hosted EMR providers)

Develop a model that encourages use.

- Keep fees low so they do not create a barrier to participation.
- Avoid incremental fees so they do not create a barrier to usage.
- Consider promotions (e.g., discounts for early adopters, free trial periods, etc.) and target incentives for those providers who are key sources of information but unlikely to participate otherwise.

Develop a model that is simple to administer.

- Base the model on annual membership fees.
- Base membership fees on easily obtainable, commonly published statistics (e.g., members for payers, admissions for hospitals, etc).

Develop a model that is value based.

- Charge separately for additional services (i.e. COV-HIE certification)
- Distribute the cost across participants proportional to the value proposition for each.
  - Consider all potential participants, public and private.
  - Recognize that perceived value will grow as the number of participants grows.

Develop a model that is self-sufficient.

- Assume there will be no subsidization of ongoing costs after initial funding ends.
- Implement a revenue model as soon as services are offered so there is no gap when initial funding ends.
- Put numbers to the model when cost estimates are available.
- As the HIE progresses, both revenue generation and expenditure control will be used as levers in managing sustainability

2.3 Technical Infrastructure

2.3.1 COV-HIE Technical Overview

In July 2009, Virginia appointed a five member advisory committee with expertise in health care and information technology to advise state government on the approval of nationally recognized technical and data standards in health information technology systems and software. Over the past year, the Health IT Standards Advisory Committee (HITSAC) advised that the key to a successful infrastructure is to build upon the interoperability framework as presented by the Office of the National Coordinator for Health Information Technology (ONC). The three parts to harmonization are:

1. Description of the standards (the data that is exchanged)
2. Description of the services (the functions that will enable the exchange)
3. Description of the policies (the business rules, trusts, etc.)

HITSAC, through the COV-HIE Topic Report, continues to advise state government on the data and technology standards for health IT.

The COV-HIE success is defined as a stakeholder experiencing, what to them resembles a single statewide and national health information exchange. The physical implementation will actually be many health care organizations and systems participating behind the scenes with standardized HIE services. To ensure interoperability and consistent operations, standards and specifications must be defined, adhered to and vendor agnostic.

The proposed architecture is to build the COV-HIE as a gateway to the NHIN and provide value added service to other COV-HIE certified HIEs. Like the NHIN, the COV-HIE will utilize Service Oriented Architecture. The COV-HIE will consider the creation of an Enterprise Service Bus (ESB) capable of communicating with the NHIN and COV-HIE key stakeholders. The ESB would adhere to NHIN endorsed standards, and serve to expose COV-HIE services for the consumption of the COV-HIE stakeholders. COV-HIE services will be added to or enhanced overtime to provide services not available in the initial offering.

HITSAC chose a hybrid architecture, whereby providers of health care services shall provide and maintain the consumer clinical data and communicate with COV-HIE with the use of edge (staging) servers that are separate from the providers' electronic medical transaction systems. The COV-HIE will communicate with edge servers to provide data in structured or unstructured data formats as defined by the NHIN standards development organization (SDO).

The Virginia Medicaid Management Information System (MMIS) is a critical application for the Health and Human Resources Secretariat and a key state stakeholder for the COV-HIE. Virginia is planning to connect the MMIS to the COV-HIE gateway through a to-be developed Commonwealth State Government Gateway. Virginia Medicaid participates as part of the Virginia Health Exchange Network (VHEN) organization (payer portal) available to all Virginia providers for eligibility (member registry) and for claims payments). These functions are handled within the Virginia Medicaid Enterprise by registering VHEN both as an eligibility vendor and a claims clearinghouse. In addition, the Medicaid Quality of Care reports can be collected through the COV-HIE to the Commonwealth State Government Gateway.

2.3.2 COV-HIE Services Description

The following section describes the services envisioned for the COV-HIE and its participating COV-HIE certified HIEs. Please note that many of the services listed are considered optional and are also subject to final policy and procedure approval for implementation by the COV-HIE Governance Body. The COV-HIE Services Matrix details services under six service categories and can be referenced in Appendix A.

1. Integration Services
   Services supporting the technical integration with the COV-HIE.
2. Core Services
   Services critical to operating the COV-HIE.
3. Functional Services
   Basic and advanced services, some of which are mandated by ONC.
4. Reporting Services
   Services meeting the reporting needs of the COV-HIE.
5. Decision Support Services
   Services meeting the advanced analytical needs of the COV-HIE.
6. Infrastructure / Utility
   Services provided through the technical architecture of the COV-HIE.

Each service category in the matrix is numbered and the services within each category are also numbered to keep the information consistent between the strategic and operational plans. Prioritization of services for implementation can also be found in the Services Matrix.

2.3.3 1. Integration Services

1.1 Consumer Participation Process

Consumers will have the option to 'opt-in' of having their health care data exchanged through the COV-HIE. Consumers will also have the option to globally opt-out after initially choosing to opt-in.

1.2 Certification Process

All participating facilities will be required to be certified to ensure the integrity, security and reliability of the data shared on the COV-HIE. The certification process will be required to connect to the COV-HIE, and will be an ongoing process where nodes of the COV-HIE will be required to maintain their certification. COV-HIE certified HIEs must adhere to the COV-HIE current published standards implementation guide, In addition, COV-HIE certified HIEs must be in compliance with Service Level Agreements (SLAs).

1.3 Onboarding Process

A defined 'onboarding' process will be in place to provide guidance and serve as an implementation plan for facilities that are in the process of connecting to the COV-HIE. This

'onboarding' process when followed will walk an organization through the steps required to obtain certification.

1.4 Call Center/Service Desk

Call Center/Service Desk will be available to address and resolve service issues on a 24 hour 7 days a week basis. The Call Center will be available to all COV-HIE certified HIEs at no additional charge. The Call Center/Service Desk will work with all COV-HIE certified HIE nodes to insure that all data is available and will provide educational and troubleshooting expertise to callers. This is not meant to be an end-user (provider or consumer) help desk function.

2.3.4 2. Core Services

The COV-HIE will implement a variety of core services that will help enable health information exchange across the Commonwealth of Virginia. Provided below is a high level overview of the core services. More technical detail on each service will be referenced in the operational plan.

2.1 Master Patient Index (MPI) Service

The COV-HIE will maintain a consumer index created by matching the consumers of the individual contributors to the central index so that records can be retrieved from all sources based upon either the consumer demographics or the id # assigned to the consumer of any of the contributors.

The MPI service will follow the NHIN architecture for consumer matching without a national consumer identifier.

The service employs probabilistic matching algorithms using data such as name, date of birth, gender, Social Security Number (SSN), address, and other person identifiers collected by source systems.

2.1.1 Consumer Identity Resolution (Non-Match)

The matching of consumers to records in the COV-HIE is a critical function. Accuracy when providing consumer medical records (current drugs allergies, problem list, etc.) must be assured and trusted for the COV-HIE certified HIE to be used and to avoid consumer harm.

The COV-HIE certified HIE will follow national standards or best practices in the determination of acceptable matching criteria and will embed well proven functionality in the central HIE services to compute these matches.

The expectation is that the match likelihood of records in the HIE will be presented to information query requestors so that they can choose whether to accept and utilize records from the HIE or not.

In the case where information providers are making available a new consumer's records to the COV-HIE, non-match will be assigned new COV-HIE Index number and considered a unique consumer.

2.2 Record Locator Service (RLS)

The RLS is the "umbrella" designation for a variety of HIE and NHIN services. The RLS provides authorized users with pointers to the location of consumer health information across the network nodes, i.e. the clinical data sources. The COV-HIE RLS will enable users to access and integrate consumer healthcare information from the distributed sources without national consumer identifiers or centralized databases.

2.3 Security Service

The COV-HIE Security Services will follow the Federal Medicaid Information Technology Architecture (MITA) framework, specifically chapter 8, Technical Architecture. The COV-HIE will include the requirements necessary to achieve this that follow the current national standards, for example, strong passwords, public key encryption and hardware tokens, as well as authentication at NIST Level 3 for access to the information.

The general approach to security for the COV-HIE will be authorization and authentication of the organization making the requests while relying upon the organizations to demonstrate and commit to processes that assure that the individuals they grant access to are only looking at appropriate consumers and for defined consumer related purposes. COV-HIE certified HIEs who do not follow the security practices may be suspended from participation in the COV-HIE.

2.3.1 Authorization and Authentication Management Service

Participant Authorization (What are you allowed to access?) and Authentication (Are you who you say you are?) will be handled via standard technologies including the use of digital certificates to assure that those connecting to the COV-HIE are authorized to access the services and via a role-based participant assignment to manage the services and data that the participant has access to.

It will be assumed that the COV-HIE certified HIEs will be responsible for controlling the aspect of rights to access information for specific consumers. COV-HIE will maintain an audit trail of requests and information provided to individuals as a reference in case of questions.

2.4 Transaction Management/Auditing

The COV-HIE will maintain records of all services requests made by the COV-HIE certified HIEs and will provide an audit trail query and reporting toolkit for troubleshooting and / or operational management information.

2.5 Connectivity to the National Health Information Network (NHIN) & NHIN Direct

Strategically the NHIN is about standards, services, and policy that enable secure health information exchange across diverse entities over the internet.

The NHIN limited production exchange uses the NHIN-CONNECT software written according to standards and specifications. The foundational NHIN components are:

- Authentication/certificates – e.g. provider authentication and identity assurance
- Delivery protocols – e.g. secure information routing

- Trust framework – e.g. – DURSA agreement
- Vocabulary/Document/Message Standards
- Directories – e.g. provider addressing and other directory services
- Security

Connectivity to the NHIN and the COV-HIE will be accomplished via the NHIN-CONNECT open source software solution. NHIN-CONNECT adheres to the NHIN standards and services to ensure that health information exchanges are capable of interoperability. NHIN-CONNECT is a Federal Health Architecture project that began in 2007.

NHIN Direct is a project to guide the development of a less complex version of CONNECT software. It is focused on smaller entities, such as physician-to-physician or physician-to-laboratory communications. The COV-HIE will consider the use cases under NHIN Direct as they are released from ONC.

2.6 Connectivity to Existing Virginia HIEs

Existing HIE's may connect directly to each other, or access information via a request through the COV-HIE. The HIE's with which the COV-HIE will exchange information must be certified by the COV-HIE to assure functionality, reliability, security, etc.

2.7 Maintain Directory Services (e.g. Providers, Hospitals, Pharmacies, etc.)

In order to assure consistency in the shared data, the COV-HIE will centrally maintain several key directories and will utilize these as the "gold standard" for related information queries and information sharing. The COV-HIE will store this information utilizing the Internet Engineering Task Force (IETF) Lightweight Directory Access Protocol (LDAP) to access these directories.

The following directories will be centrally maintained – Providers, Hospitals, Pharmacies, Insurance Companies, COV-HIE Participants, etc.

The COV-HIE will maintain a unique organization ID (OID) for each participating organization (and any national OIDs) and information about the entity's organization affiliation, roles, privileges, and HIE certification and authority.

Directory Services will include as a subset a series of "record locator services" including the abilities to locate a consumer, locate a provider or locate a member (of Medicaid for example).

2.7.1 Directory of Available Connections

Directory will hold system connection information for linkage to the COV-HIE certified HIE's, to participating state and federal systems and to reference service providers.

2.7.2 Consumer Locator Service

Consumer centered queries will be the primary function of the COV-HIE. The Consumer Locator Service will find the records of a consumer based upon the ids and demographics noted in the participant query. The participant query may be as imprecise as name or as precise a number previously linked to the COV-HIE index ID for the consumer.

The COV-HIE will provide a consumer look-up service that meets the service level performance criteria noted in Table #2 of the Service Level Agreement (SLA) found in Appendix B.

2.7.3 Provider Locator Service

The Provider Locator Service uniquely identifies health care providers administering services to Virginia citizens. The provider relationship is critical to tracking/obtaining the consumer data and essential for purposes of referral and consult verification. The Provider Locator Service will find the records of a provider based upon the ids and demographics noted in the participant query. The provider query may be as imprecise as provider name or as precise as a number previously linked to the COV-HIE index ID for the provider.

The COV-HIE will provide a provider look-up service that meets the service level performance criteria noted in Table #2 of the SLA found in Appendix B.

2.7.4 HIE Locator Service

Maintain records of COV-HIE certified HIEs. HIEs will maintain records for certified provider organizations.

2.8 Data Management (Local Cache of Edge Servers, Edge Server Backups)

The COV-HIE is being developed as a hybrid model. Some locator information will be stored centrally and other data will be accessible by edge-servers maintained by the participants, loaded with information for participant systems and accessible to COV-HIE inquiries.

Data that may be housed centrally in COV-HIE could be data that is needed for clinical data repositories for immunization or other public health requirements.

2.9 Business Continuity for the HIE

Since consumer care delivery requires 365x24x7 support, it is essential that the COV-HIE be designed for high availability. The solution must include automated failover and connectivity redundancy. All components such as power, hardware, network, databases must be addressed.

2.10 Secure Data Transfer

Federal initiatives are under way to specify standards for secure and reliable healthcare data exchange between disparate healthcare entities over the Internet. The COV-HIE will both adhere and require that COV-HIE certified HIE's conform to national and regional standards as they are institutionalized. There are several ONC transactions and components that begin to address secure data transfer requirements. These include the following:

T 17	**Secured Communication Channel Transaction** The Secured Communication Channel Transaction provides the mechanisms to ensure the authenticity, integrity, and confidentiality of transmissions, and the mutual trust between communicating parties. Its objectives include providing: mutual node authentication to assure each node of the others'

	identity; transmission integrity to guard against improper information modification or destruction while in transit; and transmission confidentiality to ensure that information in transit is not disclosed to unauthorized individuals, entities, or processes.
C 44	**Secure Web Connection Component** The Secure Web Connection Component provides the capability to access documents through a secure web browser.

Requirements such as Secure Socket Layer (SSL) version 3.0 will be specified to assure clarity from a technical perspective.

Secure data transfer is essential from both a security and privacy perspective. A secure clinical message service and secure industry standards will be utilized and required for certification.

The Secured Communication Channel Transaction will be utilized to provide the mechanisms to ensure the authenticity, integrity, and confidentiality of transmissions, and the mutual trust between communicating parties.

2.11 Message Validation and Translation

COV-HIE certified HIEs must validate and provide message translation services, as required for transactions with the COV-HIE.

2.3.5 3. Functional Services

The COV-HIE will implement a variety of functional services to provide valuable health information exchange and assist providers in becoming meaningful users of health information technology. These services aid in improving the quality and efficiency of the delivery of health care in the Commonwealth and beyond. The COV-HIE will provide a secure, efficient manner to exchange clinical data among providers by linking secure health information exchanges across the state.

COV-HIE certified HIEs will provide such functionality as eligibility checking, eRx, lab order and result delivery, as well as provider to provider communication, sharing of radiology images, and a secure portal to view health information. Additional or enhanced services will be evaluated and implemented as needed or as national standards are developed.

2.3.6 4. Reporting Services

The COV-HIE will offer reporting services to assist providers in meeting state and federal requirements. Such reports will include, but not be limited to, state-mandated electronic public health records, quality reporting, immunization registries, reportable lab results and syndromic surveillance data.

The COV-HIE certified HIEs' systems may also offer optional services such as disease management, fraud prevention and immunization reporting. Some ability for geographic or regional reporting may be available.

To maintain security and consumer confidentiality, the COV-HIE certified HIEs' systems will be required, in certain circumstances, to provide de-identified data for aggregate reporting services, as well as the ability to re-identify the data under certain circumstances.

State mandated data sets will be consistent with federal and state standards. HITSAC will guide the Commonwealth on which standards to follow. The state mandated data set will be determined by HITSAC, could be in CCD or another standardized format.

The COV-HIE will determine whether or not further automation of the reporting of state mandated data sets (i.e. through a web portal) is a necessary service to be implemented during the initial implementation phases of the COV-HIE or if the current methods of transmission from providers to the state of this data is sufficient.

2.3.7 5. Decision Support Services

The COV-HIE will aggregate demographic data about consumers centrally, including information to uniquely identify consumers. Data about the health care ailments and health care services consumed by citizens of the Commonwealth will be stored on edge servers owned by, or contracted for use by, the provider organizations that render health care services to consumers.

The COV-HIE will be able to aggregate data about consumers by accessing the edge servers. Those data can be mined for public health and other purposes, with the data kept anonymous or the consumers identified as the purpose and permission warrant.

The COV-HIE can compose queries of the data on the edge servers of provider organizations and extract those data for a wide variety of decision support services with de-identified studies for public health purposes and identified data for clinical process and outcomes studies among participating providers of care.

The Commonwealth anticipates that both the COV-HIE and COV-HIE certified HIEs that connect to the COV-HIE will offer decision support services for their customers. The COV-HIE certified HIEs will offer analytical and comparison services for consumers and providers connected to them. The COV-HIE will offer analytical and comparison services among the COV-HIE certified HIEs that connect to it.

The Commonwealth foresees most of the sophisticated analytical studies that the COV-HIE would develop occurring in Phase V of the Operational Plan.

2.3.8 6. Infrastructure/Utility Services

6.1 Knowledge Management

The longer-term vision for the COV-HIE includes provision of electronic knowledge resources, information and published literature to stakeholders (e.g. MedLine, Up to Date, AMA, and

Micromedix). Providing this service will require negotiation of licenses, which should be negotiated at discounted rates for statewide, or even multi-state, levels of participation.

6.2 Require standardized vocabularies that follow national standards to achieve semantic interoperability.

When disparate healthcare information systems refer to clinical concepts and orderable items using distinct terminologies, the data exchanged by these systems cannot be easily compared or analyzed without mapping services or human interpretation.

One of the primary obstacles to interoperability is the use of independent sets of terms and codes by the participating systems. The federal Health and Human Services Secretariat signed an agreement in 2003 to license a standardized medical vocabulary developed by the College of American Pathologists for use in the United States. The College's Systematized Nomenclature of Medicine (SNOMED) Clinical Terms creates a common clinical language.

The National Library of Medicine has developed the Unified Medical Language System (UMLS) Metathesaurus in order to provide the single most comprehensive compendium of healthcare standards. It includes over 100 constituent vocabularies.

Together, these initiatives create a system of standards that will facilitate interoperability. The following standards are critical to any HIE development and are among the standards adopted by the Consolidated Health Informatics (CHI) initiative and incorporated in the NLM's UMLS Metathesaurus:

- Diagnoses ICD-9-CM and ICD-10
- Procedures CPT-4
- Text Reports HL7 CDA
- Documentation: Problem lists, Nursing SNOMED CT
- Lab Results LOINC
- Demographics, Encounters, Units HL7
- Instrument Data Exchange IEEE 1073
- Retail Pharmacy NCPDP
- Inpatient Pharmacy NDF-RT/RxNorm

With the current state of EMR's, if translations to a UMLS-supported vocabulary are not available, the data will still be transmitted with terms from the originating clinical system.

The COV-HIE should encourage stakeholders to migrate to standardized terms as quickly as feasible, and plan for a mapping service where possible so that the data can be more useful for public health and other data aggregators. The RFP to build the COV-HIE will specifically query vendors about their translation processes and approach. COV-HIE certified HIEs, participating with the COV-HIE, must support the standard vocabularies.

6.3 Technical Infrastructure

The technical infrastructure for the COV-HIE will follow a service oriented architecture (SOA) framework. Both the technical infrastructure and operational performance will be managed through Service Level Agreements (SLAs). The public/private partnership governing the COV-HIE will seek a systems integrator to build and manage the technical infrastructure.

2.4 Business and Technical Operations

The COV-HIE organization consists of two major functional groupings for operations. The first includes governance, oversight, management, outreach, and control that consist of the Governance Body as well as the executive director and management functions of the COV-HIE. The second grouping consists of the COV-HIE Core Services Contracted Operations which contains the functions to be provided by an HIE/HIO Core Services Operations contractor. The COV-HIE, COV-HIE certified HIEs, Regional Extension Center and Virginia Medicaid coordinate provider outreach and communication activities as well as the overall provider adoption strategy and goals.

Refer to the Operations Plan, Section 2.1 for more information on the organization.

The COV-HIE's approach to meeting meaningful use is to ensure needed services are integrated first to support stage 1 of Meaningful Use (CCD, Labs, ePrescribing). Virginia HIT Regional Extension Center strategies will be built upon to bring PCPs to Meaningful Use by February 2012. The COV-HIE will build on what is in operation today as well as reach out to all provider types and specialties.

In its efforts for coordination and alignment the COV-HIE will have close collaboration and coordination among COV-HIE certified HIEs, VHIT REC, Medicaid, and broadband initiatives as well as industry associations and other stakeholder groups. There will be coordination with State Agencies through the Virginia Health Department (VDH) Office of Health IT. VHEN will be integrated into the technical architecture. Support will be given to users in becoming meaningful users of certified EMR. Lastly, there will be collaboration among the COV-HIE, COV-HIE certified HIEs, VHIT REC, and Medicaid to identify and perform outreach to providers who are not meaningful users.

The conceptual approach was based on the principles of not competing with the private sector, leveraging existing HIT/HIE within Virginia, and cost effective operations.

The Technical Architecture includes NHIN for information exchanges between states and any federal agencies connected to NHIN. It will not be used for exchanging information between Virginia COV-HIE certified HIEs.

The approach to acquire and maintain human resources across geographies and organizations it includes ensuring that the COV-HIE, Virginia COV-HIE certified HIEs, and VHIT REC are an attractive work site for IT and other human resources.

Program and vendor management include the COV-HIE organization governance, oversight, outreach, and control oversees the governance of the program, its services, and its contractor. The COV-HIE Core Services contractor is responsible for managing its partners and vendors in accordance with the contract with the COV-HIE public/private partnership.

The approach to identify and mitigate potential business risks is referred to in the operational plan.

2.5 Legal/Policy

2.5.1 State Laws

The Legal and Policy Committee of HITAC performed a preliminary analysis of Virginia law applicable to statewide health information exchange, as well as of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) as amended and affected by the HITECH Act. The Commonwealth recognizes an individual's right of privacy in the content of his health records under the provisions of § 32.1-127.1:03 of the Code of Virginia entitled "Health records privacy." Under the Code, health records are the property of the health care entity maintaining them. However, except when permitted or required by § 32.1-127.1:03 or by other provisions of state law, no health care entity, or other person working in a health care setting, may disclose an individual's health records.

§ 32.1-127.1:03 further provides that no person to whom health records are disclosed shall redisclose or otherwise reveal the health records of an individual, beyond the purpose for which such disclosure was made, without first obtaining the individual's "specific authorization" to such redisclosure. However, this prohibition on redisclosure does not prevent any health care entity that receives health records from another health care entity from making subsequent disclosures as permitted under this section and required under the HIPAA Privacy Rule promulgated by the federal Department of Health and Human Services.

The disclosure provisions under Virginia law are generally consistent with the requirements of the federal HIPAA Privacy Rule. Such entities, including health care providers, health plans or health care clearinghouses, may obtain individual authorization for disclosure, and must obtain such authorization when required to do so under HIPAA or other state law. In emergency cases or in situations where it is impractical to obtain an individual's written authorization, data may be disclosed under Virginia law pursuant to the individual's oral authorization. The maintenance, storage, and disclosure of the mass of prescription dispensing records maintained in a pharmacy registered or permitted in Virginia can only be accomplished in compliance with specified provisions of the Virginia Code; and when the individual has waived the individual's right to the privacy of the health records.

Several Virginia laws require health care providers to report certain kinds of data to the Commonwealth. Examples include certain types of prescriptions and some communicable diseases. These laws do not preclude reporting via electronic means. Reporting of such data would not be governed by the “opt-in” model because it is not voluntary in nature.

Through participation in the national Health Information Security and Privacy Collaborative (HISPC), Virginia has addressed minimum policy requirements regarding authentication and audit for interstate health information exchange. Virginia continues to make considerable progress in the areas of health information technology (HIT) and HIE regarding planning, policy, and program development and efforts have been taken to ensure that Virginia laws do not result in barriers to data exchange.

2.5.2 Privacy and Security

The creation of uniform privacy and security policies and procedures must ensure an environment of trust among the COV-HIE's health care stakeholders and the citizens of Virginia. In order to guide the development of privacy and security policies, the Legal and Policy Committee of HITAC recommended that HITAC adopt an existing privacy and security framework suited for the proposed COV-HIE initiative. The Committee evaluated existing frameworks available from the public and private domains of healthcare and recommended the adoption of the ***Connecting for Health*** frameworks, whose development was funded by the Markle Foundation and the Robert Wood Johnson Foundation. The frameworks include both policy and technical components, and reflect the consensus of over 100 participating organizations from the public and private sector. There are three interconnected frameworks within Connected for Health. These are Connecting Professionals, Connecting Consumers, and Connecting All Health Decision-Makers (Population Level Data Analysis and Action). The adoption of the three frameworks was based on the following considerations:

1. The framework addresses all major stakeholders – health professionals, consumers, public health officials, researchers, and policy makers.
2. The framework consists of internally consistent components, which will facilitate the development of a complete and consistent set of policies and procedures for the COV-HIE
3. The framework is aligned with the current Federal policy framework.
4. The framework was developed as a collaborative effort with significant involvement from all stakeholder groups.
5. The framework is easily understandable without special knowledge of healthcare or health information exchange.
6. The framework is not proprietary and does not have costs that would have to be budgeted for in the COV-HIE operations.

During the implementation phase, the COV-HIE will develop a set of policies and procedures for the operation of the COV-HIE. The following guiding principles will be used to establish policies and procedures related to privacy and security:

1. Openness and Transparency: There should be a general policy of openness about developments, practices, and policies with respect to personal data. Individuals should be able to know what information exists about them, the purpose of its use, who can access and use it, and where it resides.
2. Purpose Specification and Minimization: The purposes for which personal data are collected should be specified at the time of collection, and the subsequent use should be limited to those purposes or others that are specified on each occasion of change of purpose.

3. Collection Limitation: Personal health information should only be collected for specified purposes, should be obtained by lawful and fair means and, where possible, with the knowledge or consent of the data subject.
4. Use Limitation: Personal data should not be disclosed, made available, or otherwise used for purposes other than those specified.
5. Individual Participation and Control: Individuals should control access to their personal information:
    a. Individuals should be able to obtain from each entity that controls personal health data, information about whether or not the entity has data relating to them.
    b. Individuals should have the right to: Have personal data relating to them communicated within a reasonable time (at an affordable charge, if any), and in a form that is readily understandable; Be given reasons if a request (as described above) is denied, and to be able to challenge such denial; and Challenge data relating to them and have it rectified, completed, or amended.
6. Data Integrity and Quality: All personal data collected should be relevant to the purposes for which they are to be used and should be accurate, complete, and current.
7. Security Safeguards and Controls: Personal data should be protected by reasonable security safeguards against such risks as loss or unauthorized access, destruction, use, modification, or disclosure.
8. Accountability and Oversight: Entities in control of personal health data must be held accountable for implementing these information practices. .
9. Remedies: Legal and financial remedies must exist to address any security breaches or privacy violations.

2.5.3 Patient Participation Model

One of the central issues affecting the development of health information exchanges is that of consumer participation. This issue is fundamental to establishing trust in HIE and incorporates concerns about consent, transparency, privacy, data availability and the operation of an HIE.

After a complete assessment of possible participation models, HITAC selected the voluntary participation ("opt-in") model. Consumer participation based on opt-in, appropriately authorized, is consistent with federal and state legal requirements. The opt-in model was selected because it provides the following advantages to various participants in the COV-HIE.

Advantages for providers:

- Lowest liability associated with data disclosure to or through the COV-HIE[6]
- Complete data received through the COV-HIE, including special categories of data (substance abuse, HIV, mental health) which cannot be exchanged through a notice model or an opt-out model without additional consents and authorizations

[6] This addresses liability for data exchange only and does not address the question of whether having more information available in a consumer's medical history could lead to a new standard of care and potentially higher liability for malpractice. See "Consumer Consent Options for Health Information Exchange," prepared for the Office of National Coordinator for Health IT, March 23, 2010, p. 54.

- Same level of consumer education required for opt-in and opt-out
- Based on research about existing HIEs, opt-in participation rates can be very high[7]
- Increased trust in the relationship with consumers

Advantages for consumers:

- Increased trust in the healthcare system and their providers
- Ability to authorize health care data exchange

Advantages for the COV-HIE:

- Reduced complexity and cost if the COV-HIE later decides to change participation model (switching from opt-in to opt-out requires no work; switching from opt-out to opt-in requires obtaining agreement from every person whose data is in the exchange)
- Compliance with current Virginia laws regarding disclosure of special categories of data (substance abuse, HIV, mental health)
- Based on research about existing HIEs, opt-in participation rates can be very high

The consumer's decision to opt-in for exchange their data through the COV-HIE will be made for each entity (e.g., regional HIE, IDN) that participates in the COV-HIE ("COV-HIE certified HIE") that creates, uses or discloses the consumer's data. This decision is separate and distinct from the consumer participation model in place within the COV-HIE certified HIE. The consumer's decision to opt-in for exchanging data from a particular COV-HIE certified HIE through the COV-HIE will apply to all data available from that COV-HIE certified HIE and will make that data available to all other COV-HIE certified HIEs in the COV-HIE.

2.5.4 Trust Agreements

Trust agreements establish common agreement on essential policies and technical standards to be followed by participants of the COV-HIE. Each HIE must have trust agreements with end users which address compliance with applicable law, cooperation with other HIEs, requirements to access and use the health information network only for permitted purposes, limitation on the future use of data received through the HIE, security of data at rest and in transit, and measures regarding identity management and access credentials. .

A trust agreement is a comprehensive, multi-party agreement that must be signed by participants wishing to exchange data through the COV-HIE. The Governance Body of the COV-HIE will include various stakeholders and will facilitate the development of the COV-HIE trust agreement, which will address the following subjects, among others:

- Participation Policies and Procedures for COV-HIE participants
- Oversight, Accountability and Enforcement

[7] Ibid, p. 52. Examples include over 90 percent opt-in participation in MAeCH, 100 percent participation in notice-based DHIN (which does not include data regulated under federal substance abuse regulations).

- Technical Requirements, including Authentication and Validation
- Dispute Resolution and Damages

2.5.5 Oversight of Information Exchange and Enforcement

A Governance Body of the COV-HIE, once established, will serve as a collaborative forum for identifying issues, considering options, and advancing recommendations through a transparent and inclusive decision-making process. With regard to the legal and policy issues the Governance Body will be charged with:

- The creation and continuing review of policies applicable to participation in the COV-HIE;
- Developing the criteria and process for qualified organizations to participate in the COV-HIE and facilitating trust agreements;
- Investigating statutory barriers to HIE;
- Addressing the harmonization of business practices related to authentication, audit, authorization and access;
- Auditing participating organizations and taking appropriate corrective actions when

2.6 Communications

Widespread adoption and meaningful use of health information technology will require significant changes on the part of providers and users of health services. Effective coordination and communication with stakeholders is critical to achieving and maintaining trust and consensus regarding direction and priorities, while also supporting change management in a complex environment with many competing interests. For this reason, members of HITAC formed a Communications Committee to give input to the planning process. This Committee was composed of representatives with backgrounds as clinicians, public information officers, and persons with expertise in marketing and communications, to define the requirements and to recommend strategies and resources for effective outreach and communications during the planning and operational phases of this project. The Committee organized to consider requirements and strategies for internal and external communications for both of these phases, resulting in the following:

As part of the planning process, Committee members and staff developed the following resources:

a. an inventory of key stakeholder groups to be engaged in the planning phases of the project, as well as the key audiences to be targeted for participation in the implementation phase of the effort

b. key messages to be communicated to each stakeholder group, organization or individual, along with suggestions for timeline and responsibilities for development and delivery of informational materials

c. input into branding identity(name, logo and tag line) to support engagement and support from key audiences

d. key measures of success for the communications strategies recommended

Members of the Communications Committee emphasize the importance of transparency throughout the process of planning, implementation and operations, to establish and maintain trust and to assure effective engagement of stakeholders and possible participants.

Key stakeholder audiences, messages and delivery mechanisms were identified, as follows for the planning process:

Key Audience	Key Messages	Delivery Mechanisms	Timeframe	Responsibilities
Existing HIE / HIT Resources	▪ inventory ▪ gap analysis ▪ process for participation ▪ recommended strategic plan	▪ Personal contacts to engage, gather info ▪ e-scan ▪ distribution to points of contact (electronic, other) ▪ business-to-business marketing	March 2010 – December 2010	Communications Committee, staff
Patients / Consumers / Clients	▪ invitation / process to participate in plan development ▪ benefits of HIT / HIE (convenience, safety, efficiency, quality, cost) ▪ protections for privacy / security ▪ emphasize trust between patient and clinician ▪ process for enrollment	▪ public website, public meetings ▪ one-pager with FAQ's ▪ patient rights and responsibilities to protect privacy ▪ points of contact ▪	March 2010 – December 2010	HITAC, State HIT coordinator, state agency public information officers
Providers	▪ invitation / process to participate in plan development ▪ updates, final recommendations ▪ strategy / timeline / resources for implementation ▪ benefits of HIT / HIE	▪ public website, public meetings of HITAC ▪ e-scan ▪ on-line, print materials: one-pager with (FAQ) ▪ points of contact for further information	March 2010 – December 2010	State HIT coordinator, Commissioner of Health, Medical Society of Virginia, Virginia Hospital & Healthcare Association, Virginia Nurses Association, Virginia Association of Pharmacy
Purchasers (health plans, managed care organizations)	▪ invitation to participate in process of planning and implementation ▪ inventory readiness to participate	▪ public website, public meetings ▪ e-scan ▪ online, print	March – December 2010	HITAC, State HIT Coordinator, Virginia Association of Health Plans

	▪ benefits of HIT / HIE (return on investment, role of health plans)	materials: one-pager FAQ) ▪ points of contact for further information		
Government leaders (legislative, agency staff)	▪ Vision, mission ▪ planning process, timeline, status ▪ benefits of HIT / HIE ▪ public comments (support / opposition) ▪ recommendations (final plan)	▪ Secretarial reports, updates ▪ briefings ▪ executive summaries ▪	March – Sept 2010 (quarterly)	Secretary of Health, State HIT coordinator
Potential vendors of services	▪ opportunities to offer proposals	▪ Requests for proposals (RFP's)	Aug – Dec 2010	State HIT coordinator, project staff
Media representatives	▪ schedule of meetings ▪ materials and information used in decision-making process ▪ recommendations ▪ points of contact	▪ public website ▪ information shared at public meetings ▪ media releases	March – December 2010	State public information officers
HITAC and Committee members	▪ requirements for transparency (state requirements for public meetings, public comment, etc.) ▪ meeting notices ▪ workplan and responsibilities ▪ information and materials ▪ points of contact	▪ dissemination of information through Commission and Committee meetings ▪ postings on website (HITS, Google Groups, SharePoint) ▪ listserv ▪	March 2010 – ONC approval of plan submitted	State HIT coordinator, Committee chairs, project staff

Additionally, the Communications Committee generated ideas for concepts to be considered in developing the brand for the program, as well as a draft questionnaire to be used in conducting the consumer environmental scan. These were shared with HITAC members for input and approval. This input will be shared with the entity which is contracted to deliver COV-HIE Governance functions during the operational phase of the project.

2.7 Evaluation and Metrics

2.7.1 COV-HIE Planning Process

It is imperative early in the COV-HIE planning process to define the needs for evaluation criteria and metrics to ensure that the COV-HIE is meeting its stated goals and to provide a communication mechanism to stakeholders as well as delineate a process for continuous improvement in COV-HIE policies, procedures and operations. COV-HIE will also appropriate 2% of the overall budget to the evaluation process.

Given the strategic approach of the COV-HIE contracting for both its Governance Body as well as its functional vendors, many of the evaluation criteria and metrics will be defined and collected by these contracted entities with guidance from VDH and the selected Governance Body and the evaluation committee. However, the current stage of HIE development (as noted below) places the COV-HIE at a critical juncture where the overall requirements for evaluation and metrics must be clearly defined for the contracted entities in order to process. The planning process for outcomes and evaluation realizes that there will be many stages for the COV-HIE to pass through as it matures. The eHealth initiative foundation has identified the following six stages of HIE development [8[1]]. Virginia is currently at Stage 3.

> **Stage 1** Recognition of the need for health information exchange among multiple stakeholders in your state, region or community (public declaration by a coalition or political leader)
>
> **Stage 2** Getting organized; defining shared vision, goals, and objectives; identifying funding sources, setting up legal and governance structure(multiple, inclusive meetings to address needs and frameworks)
>
> **Stage 3** *Transferring vision, goals and objectives to tactics and business plan; defining your needs and requirements; securing funding (funding organizational efforts under sponsorship)*
>
> **Stage 4** Implementing technical, financial and legal (pilot project or implementation with multi-year budget identified and tagged for a specific need)
>
> **Stage 5** Fully operational health information organization; transmitting data that is being used by healthcare stakeholders (ongoing revenue stream and sustainable business model)
>
> **Stage 6** Demonstration of expansion of the organization to encompass a broader coalition of stakeholders than present in the initial model

At the current stage of COV-HIE development, needs [9[2]] and requirements are currently being defined. There have been substantial infrastructure development efforts from the Technical Infrastructure Committee, as well as the proposal of various process measures from other HITAC

8[1] **eHealth Initiative**. Washington, DC: Foundation for eHealth Initiative.
9[2] **Cusack CM**, Poon EG. Updated Health information exchange toolkit. Rockville, MD: Agency for Healthcare Research & Quality, 2009

Committees, most measures involving the anticipated data exchange between providers and labs, pharmacies, other providers, and public health entities.

2.7.2 COV-HIE Deployment Metrics

At a high level, the COV-HIE expects the following considerations to be taken into account by the COV-HIE contracted entities (Governance Body and technology vendors) when they develop or identify metrics for the deployment and ongoing operations of the COV-HIE.

Defining measures -- select measures that are clearly linked to the system's impact, where the sequence of events bridges inputs to outputs to outcomes. Choose a limited number of measures [10][3] with the understanding that less is more. Identify which processes or changes will impact the achievement of benefits and goals most substantially [11][4]. Use a combination of process and outcome measures. Keep in mind that outcome indicators are also important for demonstrating the meaningful impact of the eHealth initiative [12][5].Consider measuring 'disbenefits'. The measurement of disbenefits allows the implementation team to manage and minimize these negative consequences of the technology. Measures should continually evolve. There is a tendency to struggle to develop "perfect" measures instead of thinking in terms of improving measures over time [13][6]. Obtaining data to populate measures should not place an excessive burden on the organization. It is important to think through data collection and reporting issues in advance. Data sources often include routinely collected data, electronic medical records, and surveys. Where possible, measures should be populated as a 'bi-product' of care or system use. Measure benefits beyond those that have a financial value. Several organizations cited in the reviewed literature have extended this calculation to address the numerous qualitative measurements that need to be considered when assessing value. This broader measurement is referred to as Value on Investment (VOI) [14][7].

Beginning measurement -- begin collecting and reporting a measure when it becomes material to the change in question. Report when the magnitude of change is expected to be significant. Stop reporting when the reported change plateaus. The frequency of reporting for a specific measure may change over the course of a project.

Implementing measurement -- start small. Keep measures simple to begin with. Some assessments will admittedly focus on process (versus outcome) measures since the required data are easier to collect [15][8]. Investments in data collection processes can be highly valuable. The auditing of paper charts and surveying of staff/consumers during implementation may also be a worthwhile investment to obtain data related to satisfaction and health status. Establish measure

[10][3] **Thompson, Douglas,** EHR Value: Don't expect what you don't plan for. Healthcare Financial Management (2006): 58-66.
[11][4] **Taylor et al.** Quantifying Value for Physician Order–Entry Systems: A Balance of Cost and Quality. Healthcare Financial Management (2002): 44-48.
[12][5] **Scott, R, Saeed A,** Global eHealth – Measuring Outcomes: Why, What, and How". Making the eHealth Connection. (2008): The WHO Global Observatory for eHealth**.**
[13][6] **United States General Accounting Office.** Measuring Performance and Demonstrating Results of Information Technology Investments. (1998).
[14][7] **Menachemi, N,** Robert Brooks. "Reviewing the Benefits and Costs of Electronic Health Records and Associated Patient Safety Technologies". Journal of Medical Systems. 30. (2006): 159-168.
[15][8] **Kerr, E**, Barbara F. Making performance indicators work: experiences of US Veterans Health Administration. BMJ 335 (2007): 971-973.

definitions as well as clear rationale for data collection processes. Creating efficient methods of data collection, whether they be manual or automated, requires an organization to develop a clear rationale for new and continued data collection as well as specifications for accuracy, reliability, timeliness, and use [16][9].Assign monetary values where possible. Calculations should be made when it is sensible to do so, not simply possible. It is important to consider the defensibility of the chosen calculation and the required granularity of information. Leverage advancements in measurement tools to assess behavioral changes. Many studies referenced computer adaptive testing (CAT) tools as being a cost and time effective means of assessing behavioral changes [17][10].Establish a systematic approach to benefits measurement. Ensure that a variety of initiatives and resources are in place to support and facilitate regional value realization efforts, including the measurement of benefits.

3 Conclusion and Next Steps

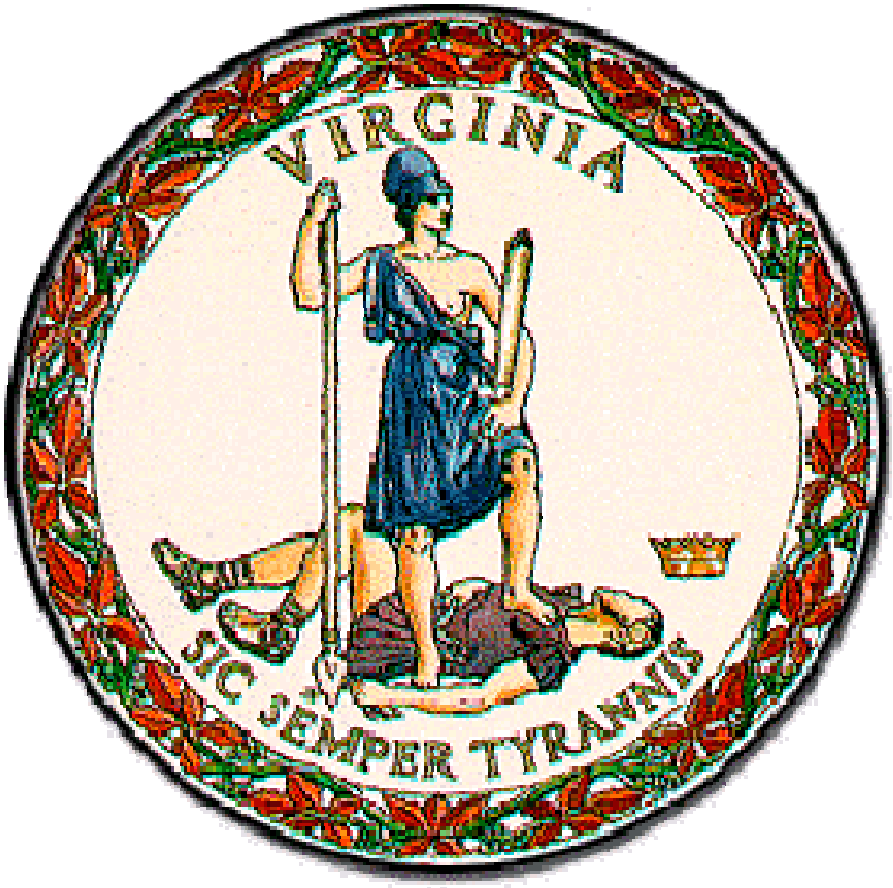
In conclusion, Virginia is pleased to submit this strategic plan for the COV-HIE to ONC. This plan was developed using a transparent multi-stakeholder process and will result in a statewide HIE that supports privacy and security while achieving desired outcomes, including meaningful use of EHRs in Virginia. This plan leverages existing HIE and HIT activities by intense coordination of activities, and by building upon what is working in Virginia. This strategic plan also allows for the flexibility necessary to operate in a fluid environment and seeks to foster innovation and remain adaptable to emerging trends and developments. Upon receiving approval and funding from ONC, Virginia plans to move directly into the operational phase of the COV-HIE using the same transparent-multi-stakeholder process to advance in the arena of health information exchange. This strategic plan and the following operational plan reinforce Virginia's deep commitment to having the most effective and efficient healthcare available for its citizenry: the ultimate goal of the COV-HIE remains to utilize health information technology to improve health care and the health of all Virginians.

[16][9] **United States General Accounting Office**. Measuring Performance and Demonstrating Results of Information Technology Investments. (1998).
[17][10]**Glasgow, R**. eHealth Evaluation and Dissemination Research. American Journal of Preventive Medicine 7;32. (2007) : S119–S126

Operational Plan

Commonwealth of Virginia Health Information Exchange (COV-HIE)

Commonwealth of Virginia



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July 30, 2010

Contents

1 Introduction

The Commonwealth of Virginia recognizes the need to take on a leadership role to determine the path and optimize the model for exchange of health information in Virginia that will utilize health information technology to improve health care and the health of all Virginians. The COV-HIE Strategic Plan, developed through a collaborative endeavor, will be implemented through this Operational Plan that outlines a corresponding and comprehensive set of activities that will achieve statewide HIE. Execution of the COV- HIE Operational Plan will enable and support Virginia's health care providers to achieve and demonstrate meaningful use of Health Information Technology (HIT) to improve the effectiveness and efficiency of health care. Virginia, through the Office of Health IT and ongoing collaboration with public and private stakeholders, plans to continue our practice of sharing information and coordinating with the HIE initiatives in other states, as well as supporting the NHIN initiatives to coordinate the development and interoperability of HIEs nationwide.

1.1 Project Schedule

The COV-HIE will begin its implementation efforts with the contracting process by the Virginia Department of Health to select an existing non-profit entity to serve as the COV-HIE Governance Body that provides the governance, oversight, management, outreach, and control over the COV-HIE. Once the COV-HIE Governance Body is contracted and operational, it will then itself perform the contracting process to select the appropriate vendors and service providers to provide the COV-HIE Core Services Operations. Each of the bidders for both the COV-HIE Governance Body and the COV-HIE Core Services Operations will propose a project management plan that includes scope, resource, schedule, quality, change control, budget, communications and risk management plans. Figure 1 depicts the overall timeline. Table A describes the desired phases, objectives, and timeline.

Figure 1: COV-HIE Implementation Timeline

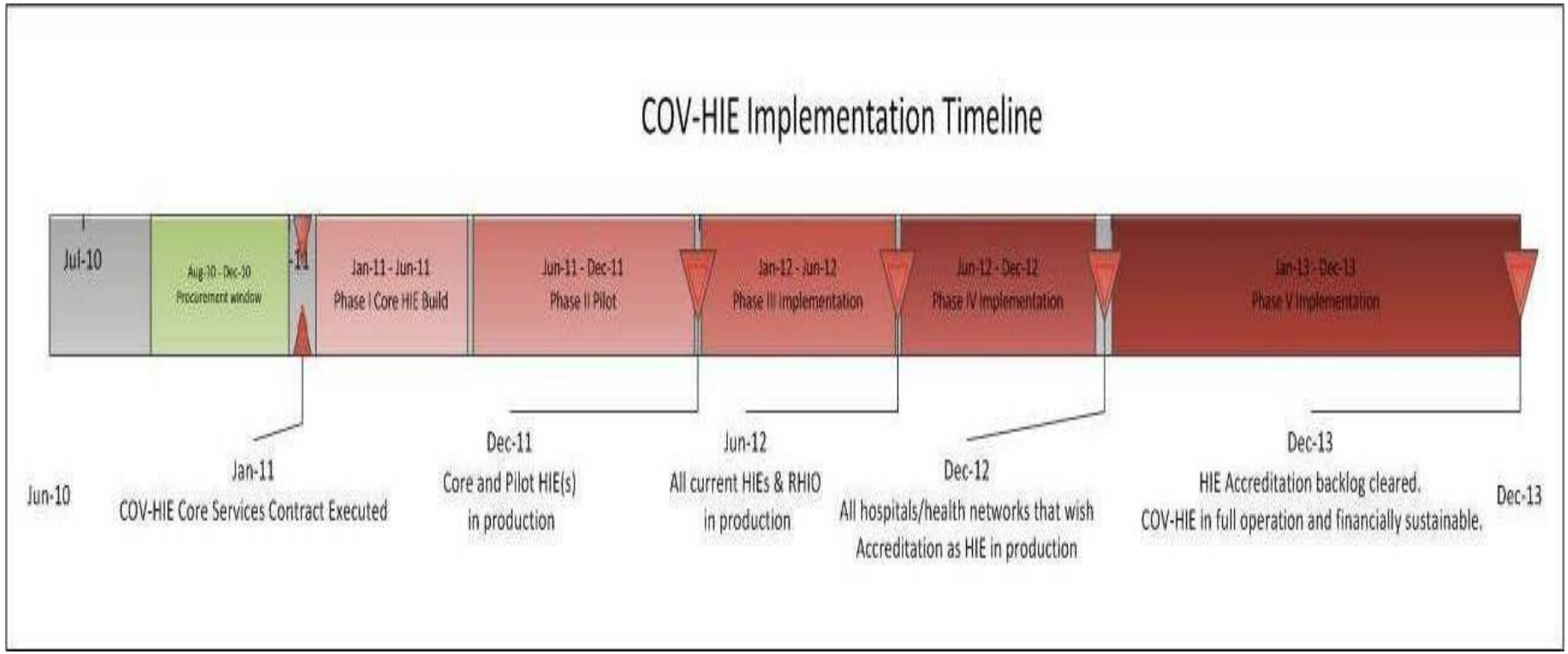


Table A: Overall Timeline, Objectives, and Schedule

Phase	Goal	Objective	Detail/Notes
Phase I - Core HIE Services Build	To establish initial HIE core services gateway capabilities	Establish organization, business processes, environments, technology, telecommunications, and services.	Jan 2011 - Jun 2011
		Requirements: Establish Governance and oversight function Establish Management, Outreach, and Control Establish business functions for technology and Technical operations; HIE services, and Trust Enablement and mechanisms to assure effective communications and transparency (refer to 2.1 Functional Organization for details) Establish services as identified for this phase in Appendix A Services Matrix, including updates to environmental scans. Develop certification and onboarding processes Establish defined metrics as described in this plan. Align with financial sustainability model. Regular status and progress reports to stakeholders, VDH, ONC and others, as required.	
		Expected outcomes: HIE Core Services contractor is operationally ready for pilot phase. Initial HIE organization(s) have been selected and are ready for pilot phase. Metrics defined	
Phase II - Pilot	To certify and onboard first HIE organization(s)	Certify first HIE organization(s). This process verifies the certification process and procedures as well as the onboarding processes and procedures established in Phase I	July 2011 - Dec 2011
		Requirements: Establish organization and business functions for Provider and Patient Services (as applicable for COV-HIE); Patient Consent informational materials and Help Desk; Finance and Evaluation; and Compliance (refer to 2.1 Functional Organization for details) Establish services as identified for this phase in Appendix A Services Matrix. Meet defined metrics. Align with financial sustainability model.	
		Expected outcomes: Implementation Phase II services available.	

		First COV-HIE certified HIE(s) from pilot in production status at conclusion of pilot. Check with neighboring jurisdictions/states on plans/timeline to connect to NHIN. HIE Core Services gateway in production status at conclusion of pilot. Lessons learned factored into certification and onboarding processes.	
Phase III - Implementation	To certify and onboard eligible HIE organization(s)	Establish services identified in service matrix for this phase. Continue certification and onboarding of HIE capable organizations. The need for a provider portal is evaluated to determine if it is needed based on current market conditions. If a provider portal is determined to be necessary, it can be established	Jan 2012 – Jul 2012
		Requirements: Establish services as identified for this phase in Appendix A Services Matrix. Meet defined metrics. Align with financial sustainability model. Institute first compliance audits on onboarded HIEs Perform initial evaluation of whether provider portal need to be implemented at the COV-HIE level	
		Expected outcomes: Implementation Phase III services available, informational materials developed and distributed to participants and end-users. COV-HIE NHIN onboarding complete, including flow-down requirements for COV-HIE participant agreements. Newly COV-HIE certified HIEs in production. All existing HIEs have been certified and in a production status for one or more services. First successful compliance audits of onboarded HIEs. Plans to implement provider portal by the COV-HIE if deemed necessary during evaluations	
Phase IV - Implementation	To certify and onboard eligible HIE organization(s)	Establish services identified in service matrix for this phase. Continue certification and onboarding of HIE capable organizations.	Jul 2012 - Dec 2012
		Requirements: Establish services as identified for this phase in Appendix A Services Matrix. Establish organization and business functions for provider services. The provider services will only be necessary if it is decided to implement a provider portal. Implement provider portal (assumes decision to implement in Phase III)	

		Meet defined metrics. Align with financial sustainability model.	
		Expected outcomes: Implementation Phase IV services available. Newly COV-HIE certified HIEs in production. Large hospitals/health systems that desire to be certified are in production. Participating organizations meet Meaningful Use requirements/capabilities. Provider portal available (assumes decision to implement).	
Phase V - Implementation	To certify and onboard last of the HIE organization(s). Begin exchanging information nationally.	Establish services identified in service matrix for this phase. Continue certification and onboarding of HIE capable organizations. Begin/expand exchanging information nationally. Also, the need to revise the patient participation model will be reviewed and changes implemented if necessary.	Jan 2013 - Dec 2013
		Requirements: Establish services as identified for this phase in Appendix A Services Matrix. Meet defined metrics. Align with financial sustainability model.	
		Expected outcomes: Implementation Phase V services available. Revised patient participation model (assumes decision to revise) Newly COV-HIE certified HIEs in production. Backlog of HIEs in certification and onboarding processes is empty. Exchange of information nationally via NHIN is occurring on a continual basis.	
Notes: 1. Assumes contract for COV-HIE Core Services Operations executed 1/2011.			

1.1.1 Possible Issues and Risks

The possible issues and risks known at this time for the COV-HIE implementation plan are listed below. A formal risk management plan is prepared as part of each of the phase of the COV-HIE project management plan. In general, a project risk committee is expected to be established to manage the risks, as well as the risk responses (mitigation & contingencies) and finally risk retirement.

ID	Name	Probability of occurrence/ Impact Level	Impact description	Time frame
1	Negative value proposition for providers	High/High	Providers see little value in participating	2011

ID	Name	Probability of occurrence/ Impact Level	Impact description	Time frame
2	Communication, education, and feedback to providers and consumers is not adequate	Low/High	Providers and consumers do not make desired decisions due to inadequate communications (provider adoption impact and patient opt-in consent low impact)	2011
3	NHIN not able to support multi-state exchange	Medium/High	Cannot exchange data with other states	2012
4	Financial sustainability	Low/High	Financial sustainability model does not prove adequate (low adoption rates) without continued public funding.	2013
5.	Inability to protect security and privacy	Low/High	Inappropriate access / release / use of protected information could hinder willingness of HIE's, providers and patients / consumers to participate, and could pose financial risk to operating entity	2011

1.2 Coordination with ARRA Programs

The COV-HIE is envisioned as only one of many parallel projects aimed at achieving greater use of Health IT across the Commonwealth of Virginia, and thus a certain level of coordination must be achieved with other projects, particularly ones funded with ARRA grants.

On the payment incentive side, coordination between the COV-HIE implementation activities and the Commonwealth of Virginia's Department of Medical Assistance Services (DMAS) revolves around the shared goal of helping providers in the Commonwealth of Virginia achieve meaningful use of Health IT as defined by the Centers for Medicare and Medicaid Services (CMS) so that providers can collect payment incentives and avoid payment penalties

The following timeline and milestones are proposed by DMAS with the expectation that final meaningful use rules will be published by CMS in July 2010. This timeline should predate the initiation of technical and functional build activities in Phase I of the COV-HIE implementation plan, which would allow the DMAS requirements to be included in the requirements and build activities of the COV-HIE.

July 2010- Final Meaningful Use rules posted

July 2010- October 2010- DMAS SMHP deliverable preparation

October 2010- SMHP and HIT I-APD delivered to CMS

October 2010- January 2011- CMS Review/Approval Cycle

January 2011- DMAS Incentive Program Implementation Start

January 2011- CMS National Level Repository Available

While the DMAS and COV-HIE infrastructure implementations are proceeding, it will be important to simultaneously work to enable providers across the Commonwealth to have access to Health IT, particularly in areas where the following key deficiencies are noted:

Lack of available or cost-effective broadband internet connectivity for providers to access and connect to their EMRs or HIE service providers and hence to the COV-HIE

Lack of EMR and/or HIE service providers that can provide cost-effective software solutions that allow providers to link into the COV-HIE

In regards to deficiencies for broadband access as they apply to healthcare providers, the State HIT Coordinator has already begun discussions with the Secretary of Technology's Office in the Commonwealth of Virginia to coordinate an environmental scan of healthcare providers regarding broadband access to produce a comprehensive map of provider broadband access and notable deficiencies across the Commonwealth of Virginia. This study will then arm both the Secretary of Technology and State HIT Coordinator with information to formulate a plan to recommend to the Virginia Legislative and Executive branches to address these deficiencies.

To tackle the second problem, the COV-HIE Provider Services Communications function will work with the Virginia Health Information Technology (VHIT) Regional Extension Center from Phase I of the COV-HIE implementation plan onwards to prepare and disseminate informational materials, describing intent, benefits, status, timeline for development and implementation, process for participation, and points of contact for more information. Information will be distributed via various mechanisms (online, print materials, presentations, events, one-to-one to key audiences (primary care providers and staff) to support provider / patient participation, to answer questions about patient consent / enrollment, and to direct them to resources available to assist with interoperability, and secure sharing and meaningful use of information, as well as requirements for compliance, reporting and incentives from public and private sources.

The COV-HIE will also maintain communication of appropriate certification and onboarding criteria, policies and procedures to the VHIT to relay to the VHIT's selected EMR solution vendors of choice (AllScripts, AthenaHealth, and MDLand). It will be encouraged that these vendors either go through the certification and onboarding process for the COV-HIE directly or to partner with an existing HIE that is going through the certification and onboarding process for the COV-HIE during Phase II (July – Dec 2011) of the COV-HIE implementation. This will allow priority primary care providers to achieve the full gamut of connectivity - from charting their patients electronically in the EMR solution recommended through VHIT which will then become their onramp to connectivity to the COV-HIE and ultimately the NHIN.

1.3 Coordination with Other States

As part of the Communications plan to be submitted and approved as one component of the RFP from interested vendors, the potential awardees for contract for the COV-HIE Governance Body will be asked to describe mechanisms and timeline for participation in interstate activities, including regional consortia, attendance / participation in regional conferences and events, and access to information via electronic means such as listserv, website and webinars.

The potential awardees will also be required to document in its proposal the allocation of resources for initial and repeat e-scans which will assure complete, accurate and up-to-date inventory of readiness for HIE within and outside state boundaries, among the key constituencies which are potential participants in state-level exchange: HIO's, IDN's, state agencies, consumer health records banks, and others which might be certified to participate.

After the COV-HIE Governance Body is selected, the COV-HIE will focus during the initial stages of implementation (Phases I-IV) on intrastate (within the Commonwealth) connectivity and communication with its participating entities that are proceeding through the certification and onboarding processes.

The COV-HIE Governance Body and the State HIT Coordinator will also be working with the Commonwealth's immediate neighbors (Kentucky, North Carolina, Tennessee, District of Columbia, Maryland, West Virginia) and their duly appointed HIE Governance Bodies and State HIT Coordinators both one on one and through the NHIN during all the implementation phases of the COV-HIE as defined by the Communications plan.

It is expected that Phase V will be where much focus is placed on arbitrating interstate communications and issues such as:

- What happens when the COV-HIE consumer participation model (opt-in) and another state's consumer participation model (i.e. opt-out) do not agree? The current NHIN DURSA says to only share what is allowed by your state law.
- What part can approved use of the COV-HIE across state lines (through the NHIN) play in the financial sustainability of the COV-HIE? What fee structure could be imposed across state lines?

Another potential avenue of cross-state cooperation for the COV-HIE is the potential use by the District of Columbia of the COV-HIE technical infrastructure as part of the District of Columbia's statewide HIE strategic plan. This is attractive due to the following:

- Small population and geographic area make HIE financial sustainability a challenge in the District of Columbia
- Large crossover in patient populations between the District of Columbia and Virginia due to proximity – immediate benefit to patients in Washington DC metro area for coordination. This coordination will also mean the District of Columbia and Virginia will also be able to exchange data immediately with each other without the need to go through the NHIN.

Options for coordination are currently being explored by both health departments within the Commonwealth and the District of Columbia. If both agree that coordination is advantageous, the Commonwealth and the District of Columbia will need to verify with ONC that such an arrangement would be acceptable under the terms of the grant funding obtained through ONC. The legislative bodies of both the Commonwealth and the District of Columbia may then need to enact legislation to formally agree to this relationship and define other terms (i.e. fee structure, cross-state governance, liability and indemnification).

2 Operations

This section describes the COV-HIE functional organization as it relates to operations. The critical functions described here are: Governance, Finance, Technical Infrastructure, Business and Technical Operations, Legal/Policy, Evaluation and Metrics, and Communications.

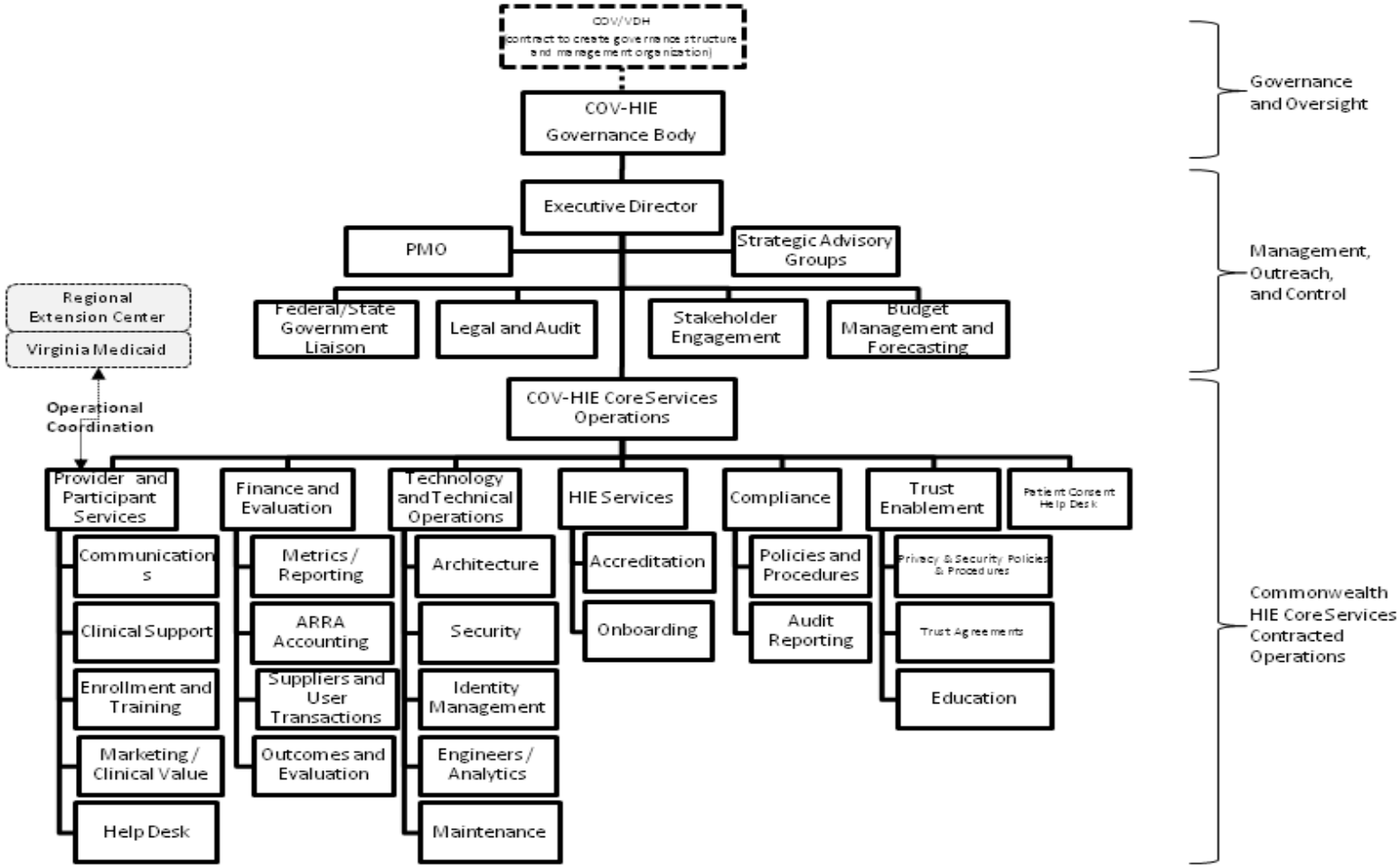
2.1 Functional Organization

Figure 2 depicts a functional view of the COV-HIE organization. The actual organization staffing and composition may vary, as it is expected that the contracted entities that fulfill each of these functions will use these as a guideline for each functions purpose but will staff them appropriately in whatever fashion meets the requirements of the function and of their respective contracts.

The Governance and Oversight as well as the Management, Outreach, and Control layers of the functional organization consist of the Governance Body as well as the Executive Director and other management functions of the COV-HIE. The Governance Body is contractually responsible to the Virginia Department of Health during the timeframe for which VDH is receiving grant funding from ONC for the development of the COV-HIE. The Commonwealth HIE Core Services Contracted Operations contains the functions to be provided by an HIE/HIO Core Services Operations contractor. The Regional Extension Center and Virginia Medicaid coordinate provider outreach and communication activities with providers and their patients, as well as the overall provider adoption strategy and goals with the HIE/HIO contractor.

The functions in the COV-HIE Core Services Operations are also typical for COV-HIE certified HIEs. The primary difference is on the client focus of the operations; the primary clients of the COV-HIE Core Services are COV-HIE certified HIEs and those organizations seeking to become certified; the primary clients of the COV-HIE certified HIEs are providers seeking EMR/EHR solutions that meet meaningful use requirements. Accordingly, the functions are tailored to the needs of the targeted clients with minimal overlap/duplication in functions and staffing.

Figure 2: COV-HIE Organization Chart



The following table describes the organization functions.

Exhibit 2-1 Description of COV-HIE Organization Functions

Category	Functional Unit Title	Description
Governance and oversight Management, Outreach, and Control	COV-HIE Governance Body	Governance and Oversight board for COV-HIE operation. Contractually responsible to VDH during the period grant funding is received and the Governance Body is under contract to VDH.
	Executive Director	The Executive Director manages the Management, Outreach and Control functions of the COV-HIE as well as the HIE/HIO Core Services Operations contractor.
	Project Management Office (PMO)	Centralized project management and coordination for HIT/HIE projects.
	Strategic Advisory groups	COV-HIE stakeholder groups that provide advice and recommendations on COV-HIE technical and business operations.
	Federal/State Government Liaison	Coordinate with Federal/State Governments and national standards groups.
	Budget Management and Forecasting	Provides budget management and forecasting for the HIT/HIE operations.
	Legal and Audit	Provides legal counsel; manages and oversees the Data Use and Reciprocal Support Agreement (DURSA). DURSA was developed as part of the NHIN effort. A DURSA agreement will be needed between COV-HIE and NHIN as well as between each party connecting to COV-HIE. Provides audit support to the Governance Body, Executive Director, and Government entities. Manages the Trust Enablement and Compliance functions under COV-HIE Core Services Contracted Operations.
	Stakeholder Engagement	Provides for outreach and communications to all stakeholders including the public.
COV-HIE Core Services Contracted Operations	COV-HIE Core Services Operations	Typical HIE/HIO operational structure depicted. This is applicable for both the COV-HIE Core Services Contracted operations as well as what is typical of a COV-HIE certified HIE.
	Provider and Participant Services	The provider and participant services function provides assistance to organizations and individuals that utilize HIE/HIO services or are interested in HIE/HIO services. It consists of the following: Communications: The communications function provides for outreach, communications / marketing, and crisis response (communication chain of command). For the COV-HIE Core Services contractor, the communications are targeted towards providers that could become COV-HIE certified HIEs. These are typically the larger institutions. For COV-HIE certified HIEs, the communications are targeted toward providers seeking services necessary for meaningful use of certified health information technology, to include sample materials for end users (regarding benefits of HIT / HIE, protections for security and privacy, outcomes measures, FAQ's and point of contact for more information). Clinical Support: The clinical support function provides professional clinical support as required in the use of the health information

		technology. This function is most applicable for COV-HIE certified HIEs that deal directly with providers. Enrollment and Training: The enrollment and training function for COV-HIE Core Services is most applicable to some training for the certification/onboarding processes. Enrollment and training function for end users is most applicable for COV-HIE certified HIEs that deal directly with users (providers). Marketing/Clinical Value: The marketing/clinical value function supports marketing efforts by defining the clinical value of services available to the current and prospective clients. From the COV-HIE Core Services perspective, the value proposition is made to prospective and COV-HIE certified HIEs. From the COV-HIE certified HIE perspective, the value proposition is made to the providers. Help Desk: The help desk function is a typical help desk function for the client base. For COV-HIE Core Services, the help desk is primarily a technical help desk that supports that the COV-HIE certified HIEs. For COV-HIE certified HIEs, the help desk is targeted for both technical and end-user support; the end user support may be redirected from the COV-HIE certified HIE to an EMR vendor's help desk based on the need of the user.
	Finance and Evaluation	Provides financial services functions for estimating, forecasting, invoicing, and accounting. It consists of the following: Metrics/Reporting: The metrics/reporting function support measurement and reporting of utilization, user, and financial reporting. ARRA Accounting: This accounting function is applicable primarily to COV-HIE Core Services that may receive ARRA grant funding (ONC). For COV-HIE certified HIEs, cost accounting for Eligible Professionals may be needed to support their Meaningful Use reporting requirements. Suppliers and User Transactions: The suppliers and user transactions provides the accounting for suppliers that are used as well as user transactions. This function is applicable for both COV-HIE Core Services and COV-HIE certified HIEs. Outcomes and Evaluation: The Outcomes and Evaluation function evaluates desired outcomes against actual. It forms the basis for management decision support and is applicable for both COV-HIE Core Services and COV-HIE certified HIEs. This function will be coordinated with Communications activities in order to assure transparency and accountability for clients, state and federal officials, and public.
	Technology and Technical Operations	Provides technical support to enrolled members. It consists of the following subunits: Architecture: This function is responsible for definition and maintenance of the technical architecture. The technical architecture includes compliance with standards defined by COV-HIE. Security: This function is responsible for the technical implementation and support of Security Policies. Identity Management: This function is responsible for managing the identities (duplicates) in the registries (MPI, Provider etc…). Engineers/Analytics: This function provides technical engineers (networking, information, and applications) that provide technical support and analytics.

		Maintenance: This function provides maintenance to hardware and software (platforms, databases, applications): applying patches, software upgrades etc. There should be versions of all materials produced by this function that are highly detailed and specific for personnel responsible for technical implementation, as well as more general descriptions understandable to the lay public.
	HIE Services	This function is specific to the COV-HIE Core Services Operations although it could be adapted by COV-HIE certified HIEs for use with EMR vendors. It consists of the following: Certification: This function defines the certification process and procedures that are compliant with the standards defined by the COV-HIE Organization. The certification process includes onboarding processes and procedures. Onboarding: This function supports the needs of an external organization to connect to the COV-HIE Core Services and other COV-HIE certified HIEs. It includes technical support for interface testing, certification, and production.
	Compliance	This function ensures COV-HIE Core Services Operations and COV-HIE certified HIEs are compliant with all relevant security and privacy requirements. It consists of the following: Policies and Procedures: This function prepares and maintains policies and procedures necessary to support all requirements (HIPAA etc.). Audit Reporting: This function provides audit information as requested to demonstrate compliance or to provide information on a breach of security. Risk Management Plan Incident Response plan, to be activated in the event of violation of security or privacy
	Trust Enablement	The COV-HIE Core Services Operations organization is a Trust Enabling Organization (TEO). This unit is specifically charged with creating and maintaining a framework of trust with its clients, patients of the clients, and other stakeholder and Participating Entities. It consists of the following: Privacy & Security, Policies and Procedures: This function ensures that privacy and security policies and procedures are followed. It is applicable to both the COV-HIE Core Services Operations as well as COV-HIE certified HIEs. Trust Agreements: This function ensures that Data Use and Reciprocal Support Agreement (DURSA) are maintained and utilized (COV-HIE Core Services Operations) as well as any agreements with users of COV-HIE certified HIEs. Education: This function provides for education materials and programs for clients, patients of the clients, and other stakeholder and Participating Entities. The COV-HIE Core Services Operations function makes available basic education materials and programs to COV-HIE certified HIEs.
	Global Opt-Out Support	The Global Opt-Out Support function supports patients who had opted in at one or more providers to have their records accessible to other providers statewide and nationally and wish to withdraw the consent. The COV-HIE will record the request and adjust the Master Patient Index. At the time of the request the records at the provider level will still exist but will not be known for statewide and national access.

2.2 Governance

There are several key operational steps that will need to be undertaken immediately in order to secure a governance structure for the COV-HIE with all deliberate haste.

2.2.1 RFP and Contracting Process to Take Place in Parallel with ONC Review of COV-HIE Plans

The contracting process will be initiated by VDH upon submission of the draft COV-HIE strategic and operational plans to ONC on July 31, 2010. VDH will issue an RFP for the COV-HIE Governance Body based on the draft COV-HIE strategic and operational plans, which will serve as requirements and evaluation criteria for any non-profit corporation that would respond to the RFP. The awardee of the contract will then be notified at the start of the RFP process that execution of the contract is contingent on release of funding from ONC to the Commonwealth for the implementation of the HIE strategic and operational plans. This approach will ensure that the Commonwealth maximizes the use of time in between the point which the draft plans are submitted to ONC and approval is obtained from ONC.

Once contracted to VDH and funding obtained released from ONC to VDH for COV-HIE implementation, the non-profit corporation will be expected to create and maintain a separate functional organization to oversee COV-HIE activities apart from any other responsibilities and/or contracted lines of business.

2.2.2 HITAC Extension for Support of Governance

The Secretary of HHR of the Commonwealth of Virginia will recommend to the Governor an extension of the Health Information Technology Advisory Commission (HITAC) for another year (October 1, 2010 – September 30, 2011) via executive order. The primary reasons for this recommendation are the following:

- Feedback from ONC on the statewide HIE strategic and operational plans will most likely be obtained 180 days after the planned submission date of July 31, 2010. HITAC has been the primary body within the Commonwealth of Virginia that has developed the COV-HIE strategic and operational plans. Without the continuity of HITAC as a constituted body able to respond to feedback from ONC at that time, responses to ONC on the strategic and operational plans could be delayed which would further delay approval of the plans by ONC and subsequent release of funding to the Commonwealth for implementation of the COV-HIE.
- It would be advantageous for HITAC to serve in an advisory capacity during the RFP process initiated by VDH for contracting with an existing non-profit non-member non-stock corporation to serve as a governance body for the COV-HIE to ensure the principles detailed by HITAC in the COV-HIE strategic and operational plans can be properly executed by the candidates for the contracted COV-HIE governance body.

2.2.3 Governance Body Composition and Succession

The contracted non-profit corporation that forms the COV-HIE Governance Body will constitute its board of directors as it deems appropriate. However, the COV-HIE Governance Body will be required by contract to include COV-HIE stakeholder participation both on the board of directors and any working committees for the COV-HIE. In addition, the Commissioner of Health, or designee, the Coordinator of the Office of Health IT, and the state Medicaid Director shall be voting board members.

An Executive Director of the HIE will be appointed or contracted by the board to ensure that all appropriate work functions of the HIE (vendor managed operations as well as the working committees and management, control and outreach functions of the COV- HIE) are properly filled either by volunteers or by contract. The Executive Director reports directly to the board.

The COV-HIE Governance Body is expected to develop a succession plan for its board of directors consistent with the mission and vision of the COV-HIE (i.e. including multi-stakeholder involvement) past the contracted timeframe with VDH (4 years) when the COV-HIE is expected to be self-sustaining with no additional federal and state funding.

The COV-HIE Governance Body is expected to act in a manner that assures transparency and accountability to the fullest extent possible, including regular communications with constituents, stakeholders and participants, via online, print and briefings for state leaders and others charged with oversight for the funded activities.

2.3 Finance

Figure 3 details the high level budget and categories for the first four years of implementation and operations as outlined previously in the implementation timeline. Descriptions of many of the budget categories are included in Section 1.1. As can be seen from the budget, the COV-HIE is expecting its first break-even year in 2012 (Year 3). The COV-HIE Governance Body will continue to aggressively pursue sustainable business funding opportunities for the HIE to eliminate dependence on grant funding; however there may be a need to pursue additional grant funding in the interim. It is expected that the non-profit status of the COV-HIE Governance Body will assist in this effort if deemed necessary.

Figure 3: COV-HIE Implementation Plan Budget

		Year 1	**Year 2**	**Year 3**	**Year 4**	
		1/2010-12/2010	**1/2011-12/2011**	**1/2012-12/2012**	**1/2013-12/2013**	**Total**
Revenue						
	Grant Funding	$1,000,000	$6,000,000	$2,300,000	$2,200,000	**$11,500,000**
	Membership Dues		$500,000	$2,000,000	$2,500,000	**$5,000,000**
Total Revenue		**$1,000,000**	**$6,500,000**	**$4,300,000**	**$4,700,000**	**$16,500,000**

Expenses						
	COV-HIE Governance & Management	$1,000,000	$274,900	$281,677	$288,849	**$1,845,426**
	COV-HIE Core Services Contracted Operations		$6,137,000	$4,013,000	$4,350,000	**$14,500,000**
Total Expenses		**$1,000,000**	**$6,411,900**	**$4,294,677**	**$4,638,849**	**$16,345,426**
Net Income		**$0**	**$88,100**	**$5,323**	**$61,151**	**$154,574**

2.3.1 Revenue and Expenses

Year 1 of the budget is actually the duration of the strategic planning period (expected to end in December 2010) and thus only the grant funding for the strategic planning period is expected as revenue given that Virginia is still awaiting ONC approval to begin executing the implementation phase of the COV-HIE. The primary expenses expected during the strategic planning phase are other direct costs associated with the planning process, particularly the costs for evaluation of respondents to the RFP that is expected to be issued for the COV-HIE Governance Body. As mentioned before, it is expected that the COV-HIE will begin the contracting process for the Governance Body prior to the award of grant funding from ONC to reduce startup time of the implementation phases once the grant funding is released. Once the COV-HIE Governance Body is contracted and can begin operations, its non-profit status will allow it to continue to pursue other grant funding opportunities outside the current allocated funding from ONC to assist in sustainability of the COV-HIE during the initial years of operations startup on an as-needed basis.

In the implementation plan outlined for the COV-HIE in Section 1.1, Year 2 (2011) is expected to encompass two six month phases, with Phase I focusing on functional and technical activities to build the COV-HIE infrastructure, and Phase II being a pilot phase for certifying and onboarding the first HIE Participating Entities to operate on the COV-HIE. As a result, there is expected to be heavy utilization of grant funding in Year 2 to support Phase I and Phase II, with limited revenue from intake of membership subscription fees from the first certified and onboarded HIE Participating Entities probably towards the last part of the year towards the end of Phase II. Other expenses for these two implementation phases include startup of many of the operational costs (described in Section 1.1), the bulk of them towards the latter half of the year in Phase II.

Year 3 (2012) will encompass Phases III and IV, where additional HIE Participating Entities will be certified and onboarded resulting in additional steady increases in revenue from membership subscriptions and reduced reliance on grant funding. In the expenses category, there should be reduced expenditure in Technology and Technical Operations compared to Year 2 as operational efficiencies are realized from continuous process improvement during ongoing operations. However, other operational costs will incrementally (but not exponentially) increase as more and

more COV-HIE certified HIEs complete the onboarding process to the COV-HIE and require additional operational resources to manage.

Year 4 (2013) contains the last currently defined implementation Phase, Phase V, where the primary focus will be continuous and sustained interstate exchange of data through the NHIN. It is expected that an appropriate revenue model for requesting entities external to the state will be developed at this point and collections will begin during this phase.

2.3.2 Staffing

Given the unique approach of the COV-HIE expecting to contract for its Governance Body, the staffing process is envisioned as such:

- In Year 1 (during the remainder of the planning period), VDH issues an RFP for a non-profit non-member non-stock corporation to become the Governance Body of the COV-HIE. The RFP would rely upon the draft COV-HIE strategic and operational plans expected to be submitted to ONC on July 31, 2010 and would clearly state that no work can begin for the selected corporation until approval of the draft plans is received from ONC and the grant funding released. HITAC serves as an evaluation body for all responses received. It is desired that the corporation is actually selected and notified of award prior to ONC grant funding being released from the approval of the COV-HIE strategic and operational plans.
- Upon approval from ONC of the COV-HIE strategic and operational (tentatively expected in January 2011), the Governance Body of the COV-HIE begins operations. The Governance Body is expected to first hire all the staff in the "Management, Outreach, and Control" portion of the organization chart detailed in Section 2.1, and then in turn contract for all the personnel in the "Commonwealth HIE/HIO Core Services Contracted Operations" portion by the end of Phase I (June 2011). Although this is an aggressive timeline, it is believed that the parallel contracting activities for the COV-HIE Governance Body that will be conducted during the end of the planning phase will allow this goal to be achievable.
- Given the contracted nature of both the COV-HIE Governance Body and the Contracted Operations staff, these contracted entities will have specific terms laid out in their contract for financial accountability and management and financial performance metrics to the ultimate contracting entity, which will be VDH during the course of the COV-HIE operations where ONC funding is being received. VDH resources necessary for the management and oversight of these contracted functions have been included in the COV-HIE Governance & Management expense line item for years 2-4.

2.4 Technical Infrastructure

The Health Information Standards Advisory Committee (HITSAC) has been working since July 2009 to recommend data and technology standards for Virginia's health information exchange. HITSAC's work resulted in the development of the COV-HIE Topic Report. The initial set of recommendations from HITSAC were reviewed and incorporated by the Technical Infrastructure Committee into the Commonwealth's HIE plan. Several approaches to the technical infrastructure for the COV-HIE were evaluated. These included consideration of federated, hybrid, and centralized architectural data models. A hybrid architecture was selected whereby

providers of health care services provide and maintain the patient clinical data and communicate with the COV-HIE through the use of edge (staging) servers that are separate from the providers' electronic medical transaction systems. The COV-HIE will communicate with the various provider organizations' edge servers to provide data in structured and unstructured data formats, as defined by the federal standards development organization (SDO).

The COV-HIE will follow the data storage requirements for clinical data as specified by the federal interoperability specifications. The COV-HIE shall also support the connectivity requirements of the National Health Information Network (NHIN) and provide connectivity to the NHIN for providers and COV-HIE certified HIEs in the Commonwealth of Virginia.

Once requirements are issued by ONC, the COV-HIE will adopt the capabilities for patient identification. The COV-HIE will provide Security Services, Patient Locator Services, and Data/Document Locator Services as adopted by ONC and the privacy and security requirements identified by ONC in the FOA. HITSAC will continue to stay abreast of the standards work being done by the federal SDO and make recommendations to the Commonwealth's Information Technology Advisory Council (ITAC) for continued alignment.

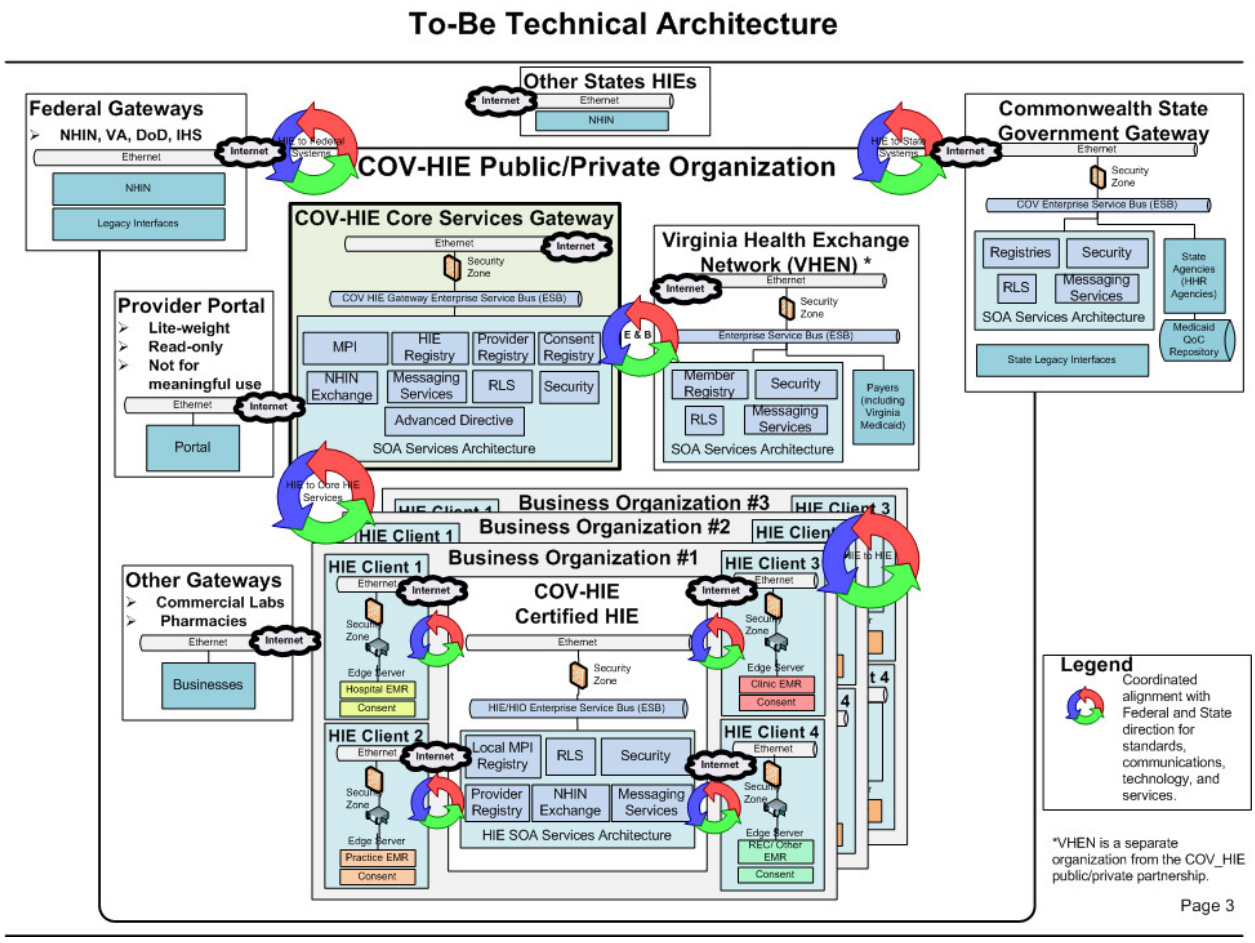
Figure 4 depicts the envisioned COV-HIE Technical Architecture. The technical architecture is aligned with Federal and Virginia direction for technology utilizing Service Oriented Architecture (SOA). It contains the following major components:

- Control, oversight, audit, and certification requirements are controlled by a public/private partnership.
- The primary telecommunication connection is the internet.
- A COV-HIE Core Services Gateway that offers statewide services to COV-HIE certified HIEs exclusively. In addition, the services offered are those that make sense from a statewide perspective rather than the regional aspects of the COV-HIE certified HIEs.
- A COV-HIE certified HIE and its clients and services form a conceptual business organization. Each of the HIE client providers meaningfully utilize certified Electronic Medical Record (EMR) system(s). Each provider owns and is responsible for posting required information on an edge server for access by the HIE as well as meeting the service level agreements for disaster recovery, backup and retention, hours of availability, and performance requirements. Information ownership is maintained by the originating provider and it is not copied or replicated by the COV-HIE Core Services Gateway. The individual HIEs may offer a value-added hosting service for the edge servers to their clients, however, that is not a required service.
- Each COV-HIE certified HIE may interact with other COV-HIE certified HIEs as well as the COV-HIE Core Services Gateway.
- The Virginia Health Exchange Network (VHEN) is an administration (payer) portal that includes Virginia Medicaid. Services include member registry and claims processing. Payer Medical professional staff may access the clinical information in order to perform necessary functions on behalf of their members such as service authorizations (medical reviews to determine need) and appeals.
- A Commonwealth State Government Gateway that provides access to state services (immunization registry, state reporting etc.). Any existing interactive/batch interfaces will

continue to be supported during the transition to SOA technology and near real-time processing capabilities.

- A conceptual Federal Gateway is used to represent information sharing via the NHIN and other Federal partners and other States.

Figure 4: COV-HIE To-Be Technical Architecture



2.4.1 COV-HIE Services Architecture

The COV-HIE Strategic Plan provides an overview of each service to be provided by the COV-HIEs and the COV-HIE certified HIEs. Please note that many of the services listed are considered optional and are also subject to final policy and procedure approval for implementation by the COV-HIE Governance Body. This section provides further technical detail on each service to further convey the Commonwealth's plan for implementing the COV-HIE. The services below are organized into six service categories. The Services Matrix can be referenced in Appendix A.

7. Integration Services
   Services supporting the technical integration with the COV-HIE.

8. Core Services

Services critical to operating the COV-HIE.

9. Functional Services
   Basic and advanced services, some of which are mandated by ONC.

10. Reporting Services
    Services meeting the reporting needs of the COV-HIE.

11. Decision Support Services
    Services meeting the advanced analytical needs of the COV-HIE.

12. Infrastructure / Utility
    Services provided through the technical architecture of the COV-HIE.

Each service category in the matrix is numbered and the services within each category are also numbered to keep the information consistent between the strategic and operational plans. Prioritization of services can be found in the Services Matrix.

2.4.2 1. Integration Services

In order to achieve the strategic objectives of the COV-HIE the following integration services are required:

1.1 Consumer Participation Process: Consumer participation preferences are made within each entity connecting to the COV-HIE, for example an integrated delivery network or an HIE ("COV-HIE certified HIE"). This opt-in preference must be made within each entity that creates, uses, or discloses the consumer's data. Consumers express their opt-in preference to share information from the connected entity across to all other COV-HIE connected entities. COV-HIE connected entities (i.e. IDNs, HIEs, etc.) are expected to establish, implement, and support their own internal consumer participation model; this model is not required to integrate with or mirror the COV-HIE model except for in the way described above.

1.1.1 Global Opt Out Support: Mechanism (portal and help desk function) that allows patients to globally opt out of the COV-HIE. Global opt out is effective at a point in time going forward.

1.1.2 HIE Opt Out Notification and Acknowledgement: Mechanism that allows the COV-HIE to notify HIE(s) when a patient has globally opted out. HIEs will acknowledge receipt of message.

1.2 Certification Process: The certification process will be in place to ensure the integrity and security of the data transmitted to the COV-HIE. All sites connecting to the COV-HIE will be required to achieve and maintain certification prior to connection or to maintain a connection to the COV-HIE. If a participating entity loses their certification from the COV-HIE and is not eligible to participate they must communicate this change in a public venue to alert patients

1.2.1 SLA Monitoring: A service level agreement (SLA) with definitive timelines, roles and responsibilities will be required for any connecting node to the COV-HIE. The SLA will be

continually monitored. If levels of service or expectations are not met, the result could be a disconnection from the COV-HIE. If a participating entity fails to meet SLA requirements and is ultimately disconnected from the COV-HIE, the entity must communicate this change in a public venue to notify patients. An example SLA can be referenced in Appendix B.

1.3 Onboarding Process: The COV-HIE will have a defined 'onboarding' process. This process will provide education to participating entities, validation of data formats and establish the SLA expectations for the connection to the COV-HIE. The onboarding process will also include notification to all connected nodes that an additional site is being added to the COV-HIE. Data from participating facilities will be transmitted from the certification date forward.

1.4 Call Center/Help Desk: A defined support and service infrastructure will be in place for all sites with a 24x7x365 support model. The COV-HIE support center will provide a trouble tracking mechanism to log all service requests which will provide problem resolution steps, with time stamps. The COV-HIE will build a knowledge data base to track all reported issues, and resolutions. This information will be reviewed on a scheduled basis for continual improvement recommendations which will be shared with all stakeholders.

2.4.3 2. Core Services

2.1 Master Patient Indexing (MPI) Service: The COV-HIE will maintain a patient index created by matching the patients of the individual contributors to the central index so that records can be retrieved from all sources based upon either the patient demographics or the ID number assigned to the patient of any of the contributors.

Patient Indexing Service will utilize proven technology for assessing the degree to which patient demographics match those of patients in the COV-HIE index. Matching patients will be linked to the existing COV-HIE Patient Index Number and unmatched patients will be assigned a new COV-HIE Patient Index Number.

The COV-HIE will maintain an index of Contributor Source patient Identifier to Patient Index Number. (PIX ITI standard transactions will be utilized).

MPI Service will satisfy all NHIN standards. Processing of near matches will result in generation of follow-up alerts for quality review and the COV-HIE software will have a function for correction of errors.

The COV-HIE Patient Matching Software will allow for adjustment of the level of confidence required before patients are considered matches. The matching algorithms will include all consideration of standard accepted criteria for determining matches (such as common forms of names (Bill / William), etc.

The following information provides additional detail that will be considered as Virginia seeks assistance to build the technical infrastructure.

- This service is expected to maintain an Index containing:
  - COV-HIE Patient Index Number
  - COV-HIE Contributor Id (e.g. HIE ID Number)

  - COV-HIE Contributor Patient Id
  - Demographics of Patient
  - Patient Status
- This service is expected to handle the following types of requests:
  - Identify Patient: Given a Contributor Source and a Contributor Patient Id – identify the COV-HIE Patient Index Number
  - Identify Patient: Given a set of demographics along with the Contributor & Contributor Patient ID
  - Add a Patient to the COV-HIE Index – Processed when a Contributor notes a new record available on the edge server where the patient is not already linked to the COV-HIE Index.
  - Update to Patient status
  - Merge two COV-HIE Index Numbers
  - Unmerge two COV-HIE Index Numbers

2.1.1 Patient Identity Resolution (Non-Match): The matching of patients to records in the COV-HIE is a critical function. Accuracy when providing patient medical records (current drugs allergies, problem list, etc.) must be assured and trusted for the COV-HIE certified HIE to be used and to avoid patient harm. The COV-HIE is expected to be very conservative in its patient matching policies. When information queries are received, the COV-HIE will return a list of all records with matching scores higher than specified percentage. The information requester will then make the determination which of the records in the list to utilize.

When information providers are making available new records to the COV-HIE – these will be linked to an existing record if matching 100% - but will otherwise be considered unique patients until verified.

The COV-HIE will present back records of close matches giving the opportunity for review and correction of the records.

The COV- HIE will provide the following functionality related to the non-matched patient:

- Queries will display close-matches as well as perfect matches and will show the matching "score"
- Additions of new patient records from contributing sources that are not matched to existing records will be assigned a new COV-HIE Index Number.
- A list of close matches and recently added patients will be made available to the contributing source for verification of their records.

Any of the participating provider organizations can adjust the index assignment of their patients in the COV-HIE by asking their patient to verify that they are the patient being presented from another participating provider organization.

2.2 Record Locator Service (RLS): The RLS is the "umbrella" designation for a variety of HIE and NHIN services. The RLS provides authorized users with pointers to the location of patient health information across the network nodes, i.e. the clinical data sources. This enables

users to access and integrate patient health care information from the distributed sources without national patient identifiers or centralized databases.

For example, the RLS primarily maintains an index of pointers to the network location of patient information, but not the personal health information itself. This service enables a federation of diverse clinical data sources to enable a consolidated view of a patient's electronic health care records. Record locator services include directories of practitioners/physicians, hospitals and care delivery entities, patient identification, payers, pharmacies, labs and diagnostic testing centers, public health, and other key stakeholders that need to be identified for access to and responses from HIEs or the NHIN.

2.3 Security Service: Participants in the COV-HIE will be required to agree to the security policies prior to access. The capabilities of the participant to secure their information and follow the safeguards put in place will be tested during the certification process.

Organizations must agree to and demonstrate capabilities to:

- The individual members of the organization accessing the COV-HIE will be uniquely identified.
- Processes will be provided that authenticate these users following HIPAA and other standards including a two factor authentication process. Consideration will be given to those applications accessing the COV-HIE service where the participant has already appropriately authenticated themselves.
- Connections from an organization to COV-HIE will be authorized by COV-HIE through a process utilizing digital certificates to establish the connection.
- Information being transmitted to and from COV-HIE will be encrypted.
- COV-HIE will provide services that manage the authorization of individuals to access COV-HIE records. Such authorization will support identification of different classes of participant with access rights in COV-HIE that will vary. At minimum, the following classes of use will be defined:
    - Administrator – will have access to enroll and change access status for individuals of their organization.
    - Provider – will have ability to query COV-HIE and can initiate import of a CCD to their organization's records.
    - Others – will have ability to query COV-HIE.

The technical architecture solution will require an Administrative module that will handle the functions related to the management of the user accounts and access to the system. Access must be available to central resources (to grant organizational admin rights) and organizational administrators to maintain rights of their participants.

The solution will require inquiry capabilities (e.g. list the authorized users) and ability to extract data from COV-HIE.

2.3.1 Authorization and Authentication Management: The COV-HIE will provide a Public Key to each of the participants sharing data. Data being transmitted to COV-HIE will be encrypted via this public key and de-encrypted via COV-HIE's private key.

Requests for connection to COV-HIE will contain the name of the participating organization and the ID of the individual participant. These requests will be encrypted. Connections to the services will be accepted only if (after decryption) the organization is known and in good standing and the individual is authorized.

Once connections are established, requests for services will be authorized via reference to the defined role of the connected participant.

2.4 Transaction Management / Auditing: The COV-HIE will support all audit trail requirements implemented or mandated as part of the national approach so that the COV-HIE capabilities are at least equivalent to the NHIN capabilities.

Each access and service request will be logged by COV-HIE. The information will be accessible by Participant Organization, Individual, and type of service request. Information related to the success of the service request will also be maintained.

COV-HIE administrators, within the participant organizations, will have access to the audit trail information related to activities of personnel in their organization and related to external accesses to the data they are sharing. Central COV-HIE administrators will have access to all of the data.

The COV-HIE system will maintain audit trail records in varying levels of accessibility based upon the age of the records. Some information will be moved to alternate forms of storage after defined time periods, but the intent overall is to keep the information accessible for the periods required for medical records.

2.5 Connectivity to the NHIN: The COV-HIE will operationalize the NHIN & NHIN Direct standards, services, and policies that enable secure health information exchange across diverse entities over the internet.

Connectivity to the NHIN and COV-HIE will be accomplished via the NHIN-CONNECT open source software solution. NHIN-CONNECT adheres to the NHIN standards and services to ensure that health information exchanges are capable of interoperability. NHIN-CONNECT is a Federal Health Architecture project that began in 2007. There are three primary components that make up the NHIN-CONNECT solution.

2.5.1 The Core Services Gateway to locate patients at other organizations, request and receive documents associated with the patient, and record audit trails. The NIHN Interface specifications are implemented within this component.

2.5.2 The Enterprise Service Components support electronic health information exchange by providing a Master Patient Index, XDS.b Document Registry and Repository, Authorization Policy Engine, Consumer Preferences Manager, HIPAA-compliant Audit Log, etc.

2.5.3 The Universal Client Framework applications that can be used for a variety of purposes to incorporate application function on top of the NHIN-CONNECT platform. Applications can be used as a reference system, test, or demonstration for the gateway solution.

NHIN-CONNECT is based on service-oriented-architecture design principles, and web service interfaces. This architecture enables individual components to be replaced where they adhere to the defined web service interface specifications. It is also platform independent. NHIN Direct is a project to guide the development of a less complex version of NHIN-CONNECT software. It

is focused on smaller entities, such as physician-to-physician or physician-to-laboratory communications. The tools being developed include descriptions of standards, and services and policies to enable secure health data transmission over the internet.

Eventually, communities should have three clear options for connectivity, either via NHIN-CONNECT, NHIN Direct, or health information exchanges; which themselves may use the other two options.

2.6 Connectivity to Existing Virginia HIEs: HIE's in Virginia may connect directly to each other, or access information via a request through COV-HIE. The HIEs that COV-HIE will exchange information with must be certified to assure functionality, reliability, security, etc. Virginia currently has several operational HIEs. It is anticipated that these HIEs will seek certification to participate as a node on the COV-HIE. Some of these HIEs currently have direct connections to the NHIN and it is anticipated that they will continue to manage those connections. New HIEs entering the Virginia marketplace will have the option to use the COV-HIE connection to the NHIN or build their own according to NHIN standards.

2.7 Maintain Directory Services (e.g. Providers, Hospitals, Pharmacies, etc): Entities will be entered to the COV-HIE directories in one of three ways:

1. Loaded to the COV-HIE directories from other, trusted official sources (example being the State of Virginia provider database)
2. Entered as the individual entity becomes a COV-HIE participant
3. Created / Updated via a COV-HIE service. New entries will be screened for potential duplicates.

The COV-HIE will trust the latest dated information received – but maintain access to previous versions of records. The COV-HIE will provide look-up services related to each type of directory that allow authorized participants the ability to see basic or extended information about the resource. The COV-HIE will provide a mechanism for direct adjustment and editing of records.

2.7.1 Directory of Available Connections: The COV-HIE will maintain a directory of all the available connections being managed.

2.7.2 Patient Locator Service: Patients will be added to the COV-HIE directory as they are either the subject of a patient oriented function (like a lab test, prescription, or eligibility inquiry) or when a summary of their condition (a CCD record) is added by a participant. These actions will result in adding the patient to the directory, if not present (based upon the matching criteria).

The patient record locator service will accept as input a set of demographics including at minimum the patient name – but also potentially including other key fields such as Birth Date, Address, etc.

The locator service will return a count of the number of COV-HIE records that match the criteria provided and the number of additional records that are close matches (scores greater than a percentage of certainty) along with the unique COV-HIE ID of the primary (or 1st match).

2.7.3 Provider Locator Service: Providers will be added to the COV-HIE Directory as they are either loaded from the state registry, the subject of a provider oriented function or when the

provider is added as a COV-HIE participant. These actions will result in addition of the provider to the Directory if not previously known (based upon the matching criteria).

The provider record locator service will accept as input a set of demographics including at minimum the provider name – but also potentially including other key fields such as Participant Provider ID, Birth Date, Address, Social Security Number, etc.

The locator service will return a count of the number of COV-HIE records that match the criteria provided and the number of additional records that are close matches (scores greater than a percentage of certainty) along with the unique COV-HIE Patient Index ID of the primary (or 1st match).

2.7.4 HIE Locator Service: Maintain records of COV-HIE certified HIEs. HIEs will maintain records for certified provider organizations.

2.8 Data Management (Local Cache of Edge Servers, Edge Server Backups): The processes to certify participants to COV-HIE will include testing of transactions as well as review of the architecture of their servers and the ability to execute the processes expected at the edge server – (sending notices of records added, allowing access to data when inquired on by others, etc).

The COV-HIE is being developed as a hybrid model. Some data will be stored centrally and other data may be accessed by edge servers maintained by the participants, loaded with information for participant systems and accessible to COV-HIE inquiries.

Participants maintaining patient data will be required to demonstrate that they have implemented an acceptable back-up plan that meets defined COV-HIE recommendations and to demonstrate their plans for recovery in case of the loss of primary servers or databases.

2.9 Business Continuity for HIE: Since patient care delivery requires 24x7x365 support, it is essential that the COV-HIE be designed for high availability. The solution must include automated failover and connectivity redundancy. All components such as power, hardware, network, databases must be addressed. Ideally, the system could be shared over separate geographic locations so that a separate cold site is not required. Specific functions which should be addressed include:

- Full and incremental backups while applications are running and data bases are being updated.
- Automatic fail over to back up servers, address mechanism e.g. shadow servers, clustering, etc.
- Transaction logging and roll forward for recovery and transaction integrity

2.10 Secure Data Transfer: Secure data transfer is essential from both a security and privacy perspective. A secure clinical message service and secure industry standards will be utilized and required for certification.

The Secured Communication Channel Transaction will be utilized to provide the mechanisms to ensure the authenticity, integrity, and confidentiality of transmissions, and the mutual trust between communicating parties. Objectives include providing:

- Mutual node authentication to assure each node of the others' identity

- Transmission integrity to guard against improper information modification or destruction while in transit
- Transmission confidentiality to ensure that information in transit is not disclosed to unauthorized individuals, entities, or processes

2.11 Message Validation and Translation: The COV-HIE expects COV-HIE certified HIEs to do the necessary translations to populate or pass through the data in a standardized format on the edge servers.

2.4.4 3. Functional Services

3.1 Electronic Eligibility and Claims Transactions: There are no plans currently in Virginia to directly use the COV-HIE will provide functionality to exchange patient eligibility and health claim information, as this is promoted and implemented by the VHEN effort. However, this may change, and if so the exchange methodology will be based on national standards and will be relative to contractual and operational arrangements contained in VHEN and COV agreements yet to be determined.

3.2 Electronic Prescribing and Refill Requests: EHRs participating in HIEs that connect to the COV-HIE will use SureScripts to send e-prescribing transactions between prescribers, and pharmacies using nationally accepted standards.

3.3 Prescription Fill Status and/or Medication Fill History: EHRs participating in HIEs that connect to the COV-HIE will use SureScripts to support prescription fill status and/or medication fill history.

3.4 Electronic Clinical Laboratory Ordering and Results Delivery: The COV-HIE will provide for the electronic clinical results delivery and exchange of orders including laboratory data according to national standards. It will also enable the transfer of lab orders and results from labs or healthcare systems to providers.

3.5 Clinical Summary Exchange for Care Coordination and Patient Engagement: Clinical summary exchange for care coordination and patient engagement will be exchanged through COV-HIE using the standard HL7 CCD format.

3.6 Results Delivery of Radiology and Lab reports: HIEs connecting to the COV-HIE will provide for the delivery of HL7 results between providers including lab and radiology results.

3.7 Admission Fact Sheets: HIEs that connect to the COV-HIE may provide the ability to transfer reports such as Admission Fact Sheets, discharge summaries in HL7 format.

3.8 Clinical Message Services to Provider: The COV-HIE and HIEs connecting to the COV-HIE will provide secure clinical message services enabling provider to provider

communication. The format, yet to be determined (SMTP, text based, proprietary, etc,) will comply with national standards.

3.9 Chart Summaries to ERs, Hospitals, Clinics, and Providers: The COV-HIE and HIEs connecting to the COV-HIE will provide services to enable the transfer of chart summaries to ER, hospitals, clinics, and providers using the CCD format.

3.10 Hospital Discharge and Transfer Data, Reports, and Summaries to Other Providers: The COV-HIE will provide the functionality to transfer Hospital discharge and transfer data, reports, and summaries to other providers.

3.11 Provider-to-Provider Communication: The COV-HIE will provide the capability for electronic referrals, consults, and transitions in care. An electronic messaging conduit must be integrated in to the COV-HIE for the transference of pushed messages triggering a notification at the provider's system concerning a new patient or consult.

3.12 Radiological Image Exchange: HIEs connecting to the COV-HIE may provide services to exchange images using the DICOM standards.

3.13 Cross-Enterprise Scheduling: HIEs connecting to the COV-HIE may provide scheduling services. The COV-HIE will act as a conduit for these messages or services but not offer them individually.

3.14 Auditing and Accountability: The ability to support the recording of transactions and associated security related data as well as the capability to review such recordings will be provided by COV-HIE and HIEs that connect to COV-HIE.

3.15 Provider Clinical Information Portal: A provider portal that supports read only access to patient records will be provided. This is intended for supporting better patient care until meaningful use can be achieved by all practitioners. A consumer portal is not being supported at this time as it is expected that participating entities will provide this service to consumers as a value add.

2.4.5 4. Reporting Services

The COV-HIE will offer reporting services to help provider organizations meet state reporting requirements. Such reports will include, but not be limited to, state-mandated electronic public health records, quality reporting, immunization registries, reportable lab results and syndromic surveillance data.

COV-HIE certified HIE systems may offer optional reporting services such as disease management, fraud prevention and immunization reporting. Some ability for geographic or

regional reporting may be available. Interfaces to patient-based personal health record systems may also be available as the COV-HIE matures.

To maintain security and patient confidentiality, the COV-HIE certified HIE systems will be required to provide for de-identification of data presented for aggregate reports.

4.1 State Reporting Services: The COV-HIE will provide a mechanism for transferring state mandated data from its participating provider organizations to the appropriate state agencies. Depending on the data and reporting requirements, this service could include data capture, de-identification, aggregation and reformatting of mandated information or just a data feed to the receiving agency. The participating provider organizations will have the option to use this COV-HIE service to meet their state reporting requirements. As described in the strategic plan, the Virginia State Lab, known as the Division of Consolidated Laboratory Services (DCLS) applied for funding under the "Epidemiology and Laboratory Capacity for Infectious Diseases Cooperative Agreement" known as the ELC Program. The program will be in partnership with the COV-HIE to develop standards based messaging and workflow for reporting notifiable disease data to hospitals, clinicians, the Virginia Department of Health and Centers for Disease Control and Prevention (CDC).

Reports to be provided are noted below.

4.1.1 Electronic Public Health Reporting: These reports will be managed by COV-HIE in accordance with Federal Interoperability Specification 11.

4.1.2 Quality Reporting: These reports will be managed by COV-HIE in accordance with Federal Capability 130.

4.1.3 Immunization Reporting: These services will include public health reports for immunization registries for the patient population, in accordance with State standard § 32.1-46.01 of the Code of Virginia.

4.1.4 Mandated Reportable Lab Results: These services will include reportable lab results, in accordance with Sections 32.1-36 and 32.1-37 of the Code of Virginia and 12 VAC 5-90-80 and 12 VAC 5-90-90 of the Board of Health Regulations for Disease Reporting and Control [www.vdh.virginia.gov/epidemiology/regulations.htm]).

4.1.5 Syndromic Surveillance Data: These services will include public health reports for syndromic surveillance data for the patient population, in accordance with Sections 32.1-36 and 32.1-37 of the Code of Virginia and 12 VAC 5-90-80 and 12 VAC 5-90-90 of the Board of Health Regulations for Disease Reporting and Control [www.vdh.virginia.gov/epidemiology/regulations.htm]).

4.1.6 Advance Directives: These services will include healthcare proxy, organ donation, Do Not Resuscitate and other such directives.

4.2 Subscription / Notification Service: HIE systems may offer optional reporting to Federal and other entities; this will include data capture, aggregation and reformatting of mandated information. Entities will subscribe to the service on an opt-in basis. The HIE will manage the subscription status for each report.

Examples of such Report Services are noted below:

4.2.1 Disease Management: These services may include commonly mandated reports for healthcare, as well as Geocoded population summary exchange (GIPSE) and Health Information Event Messaging (HIEM).

4.2.2 Geographic Reporting: These services may include linking clinical data from all providers within a geographic area to provide sub-regional report analysis.

4.2.3 Fraud Prevention and Detection: These services may include establishing providers' legal records and building an evidence trail, this information will be based on Federal and State legal standards.

4.2.4 Patient-Based Personal Health Record: These services may include the ability to deliver aggregated personal health data to the providers in order for them to deliver the record to their patients.

4.3 Anonymization of Protected Data: This service would provide an algorithm that can convert a person's identity into a meaningless code, and then convert the code back again to re-identify the person when necessary.

2.4.6 5. Decisions Support Services

5.1 Advanced Clinical Decision Support: The COV-HIE can offer to COV-HIE certified HIEs analytical services for their providers of health care services. Trend analysis in data and predictive modeling of outcomes of characteristics of patients and treatments become more sophisticated and accurate daily. The COV-HIE could receive data feeds from COV-HIE certified HIEs for their customers that are providers of care and produce analyses of those data as a service. For instance, the COV-HIE can analyze data in the CCD records of patients organized by types of providers of care and, produce statistics on variation in treatments and clinical outcomes by type of disease or type of treatment. The COV-HIE could organize a benchmarking service showing how use of medications and diagnostic studies and therapeutic procedures varies by provider of care, or by type of patient – with type defined in a myriad of ways using clinical and demographic data in the CCD.

When used for public health reporting purposes, the COV-HIE would need to develop methods for de-identifying data when necessary and also re-identifying the data as required in certain conditions by the Commonwealth statute. These datasets will need to be stored separate from the primary data sets used to generate data for general CCD exchange.

The key concept supporting these services is the standardized data set of the CCD, which includes demographic information, vital signs, laboratory results, diagnosis codes, medications, procedure codes, measures of functional status, immunizations, social history, etc. With these data defined by standardized reference terminologies and formatted in XML to be incorporated into databases, the COV-HIE can offer analytical services for trend analysis and predictive modeling to help providers of care understand how their practices and patients' outcomes compare to those of other providers of care and help patients anticipate clinical outcomes based on their habits of living, defined by demographics and social history, and physiology, defined by vital signs and laboratory results, and treatment, defined by procedures and medications.

The COV-HIE could provide these analytical and predictive modeling services to state government as well, comparing practice habits of providers of care across their cohorts of patients receiving Medicaid or identifying communities where immunization rates are low or communities with higher than expected rates of diagnostic studies (small area variation studies).

With the standardized data of the CCD available for millions of patients in Virginia over the COV-HIE certified HIEs from edge servers maintained by providers of care, the COV-HIE could offer services to suggest differential diagnoses on patients based on patients' signs and symptoms and laboratory results, using expert systems such as Isabel (www.isabelhealthcare.com) and QMR (Quick Medical Reference).

The COV-HIE could offer to COV-HIE certified HIEs services to interpret and predict patients' reactions to medications and other forms of treatments based on their genetic biomarkers.

5.2 Preventive Care Services: The COV-HIE can offer to COV-HIE certified HIEs analytical services on a fee-for-service or subscription basis, such as identifying all persons by age and illness (chronic lung disease) in need of pneumovax or influenza vaccine or tetanus vaccine or standard immunizations of childhood.

The COV-HIE could identify populations of patients taking medications that have been recalled.

The COV-HIE can offer monitoring services to local HIEs and/or providers of care for patients with chronic disease, arranging the monitoring of vital signs, mental status and functional status through home monitoring equipment and a centralized monitoring service at the COV-HIE to alert patients and their physicians or home health agencies when recrudescence of symptoms from chronic lung and heart disease increase in likelihood in an effort to prevent acute decomposition of organ function and return to hospital of those patients. Standardized data about vital signs and functional status and home monitoring of laboratory results such as serum glucose plus telecommunications for physiological monitoring of heart rate and blood pressure and functional status all can move over COV-HIE certified HIEs to the monitoring service organized by the COV-HIE.

5.3 Other Reporting/Decision Support/Business Management Services

5.3.1 Epidemic management: Epidemics of infectious disease can occur suddenly, in the case of food borne pathogens producing acute vomiting and diarrhea, or gradually, in the case of the spread of Lyme disease south and west from New England into the Mid-Atlantic regions and spread of HIV and other venereal diseases. The CCD file format will contain diagnosis codes and laboratory results identifying these diseases, and the COV-HIE can offer services to local governments and providers of care mapping the extent and spread and concentration of these diseases by community.

Daily surveillance of updates of CCD data on patients in Virginia by the COV-HIE could be used as an early warning system for epidemics of diseases caused by bioterrorism. In this case, the COV-HIE certified HIEs would query the edge servers of their customers daily for specific diagnoses and constellation of symptoms.

5.3.2 Outcomes management: Persons with chronic disease (obesity, congestive heart failure, chronic obstructive pulmonary disease, bronchitis and emphysema, type I and II diabetes mellitus, osteoarthritis) consume health care services (diagnostic tests, medications, surgical procedures) with greater frequency and total cost than do persons without these ailments. The data in the CCD can be mined over time to associate the functional status and clinical outcomes of patients, including periods of time with improving functional status and without health care visits, with previous treatments or changes in behavior. The COV-HIE can analyze data extracted by COV-HIE certified HIEs from edge servers and sent to the COV-HIE to associate changes in patients' outcomes with changes in their habits and treatments.

Near real-time studies of treatments and outcomes will be possible with daily access to updates of the data of patients in the CCD and physiological data from monitors in homes of patients conveyed over the COV-HIE certified HIEs to central monitoring stations in the COV-HIE certified HIEs or the COV-HIE. The COV-HIE can offer central monitoring of laboratory results from the CCD data and from physiological monitors in patients' homes.

2.4.7 6. Infrastructure/Utility

The COV-HIE Governance will seek integrator(s) to build and manage the technical infrastructure for the state HIE. Detailed infrastructure and utility requirements and options will be developed by the partnership.

The COV-HIE may serve as a central consulting service to help stakeholders understand meaningful use and keep current on modifications in criteria. As the COV-HIE matures, it could serve as a collection mechanism for meaningful use metrics to be reported to ONC.

Disaster Recovery

Recovery Time and Recovery Point Objectives

Area	Platform	Recovery Time Objective (RTO)	Recovery Point Objective (RPO)
COV-HIE	Registries (master patient registry etc…). Hot site required.	1 minute	Data less than 5 minutes old.
Connected COV-HIE certified HIE	Edge server(s)	1 minute	Data less than 24 hours old.

Data backup and Retention

Backup

Item	Type	Retention period
COV-HIE	Daily incremental and weekly full backups	Backup media rotated to secure offsite storage.
Connected COV-HIE certified HIE	Defined by partner to support RTO &RPO objectives. Operational systems providing data to edge server could serve as	Backup media rotated to secure offsite storage.

	backup	

Backup Data Retention

Item	Type	Retention period	Comment
COV-HIE	Registries	7 years	Need to discuss relative to best practices and federal requirements
Connected COV-HIE certified HIE	Edge server(s)	None	Populated from partner's operational systems
Off-line	Cartridge	7 Years	

Operational Specifications

Operational Security

All security measures and infrastructure models proposed or implemented by the COV-HIE must meet the guidelines of the National Institutes of Standards and Technology. These guidelines will include the Cryptographic, Security and Management Assurance, and Guidelines for Robustness and Internet Infrastructure Protection. HITSAC will continue to evaluate and consider updates to selected security measures and infrastructure models during the COV-HIE implementation and operational timelines.

Overview

The NHIN Security Zone represents secured virtual environment that exists between NHIE gateways. This environment is the implementation of the basic principles behind security on the NHIN.

- The integrity of the information passed is assured for each and every transaction across the NHIN
- Any information passed across the NHIN can only be understood by participating NHIN organizations
- Members of the NHIN have to have reasonable assurance that other participating members will honor service commitments related to security operations.

The primary technical mechanism used to support these principles is the use of a standardized managed Public Key Infrastructure. The infrastructure provides for the governed allocation and management of public key certificates to both NHIN and COV-HIE participants.

Operational Infrastructure Security Plan

In order to establish the NHIN Operational Infrastructure the COV-HIE Program intends to submit for approval to ONC the information necessary to receive Certification and Certification

(C&A) and Authority to Operate (ATO) for the COV-HIE infrastructure and services. The Security Plan will include five main areas:

1. Managed PKI provided by a commercial certificate authority.
2. Identify management and access control methodology
3. ServerVault (vendor) as the hosting provider for the Universal Description Discovery and Integration (UDDI) registry.
4. Operational Availability Monitoring; this will be added to the security plan as an addendum when scheduling permits.
5. Non-technical Security Controls - DURSA (Data Use and Reciprocal Support Agreement) the legal agreement between participants plus testing controls, and a strict onboarding procedure is also used to protect the COV-HIE and its COV-HIE certified HIEs.

One C&A and ATO is being created for all NHIN infrastructure components providing a coherent and complete security picture of the entire system. Based on these drivers a set of guiding principles are defined that help steer the overall architecture for COV-HIE in parallel with the NHIN:

- Adopt industry proven approaches for secure exchange of information
- Adopt an architecture that is platform neutral, standards based, and specification driven

2.5 Business and Technical Operations

An existing non-profit non-member non-stock corporation will be selected via an RFP process to provide governance, oversight, management, outreach, and control of COV-HIE operations via contract with the Virginia Department of Health, to become the COV-HIE Governance Body. This COV-HIE Governance Body will hire an Executive Director that will be responsible for establishing the organizational structure consistent with the functional organization and timeline requirements in this document. Another RFP will be issued by the COV-HIE Governance Body to obtain the services of a HIE/HIO Core Services Operations contractor. The contractor will provide the details on staffing and the development of polices and standards operating procedures. COV-HIE certified HIEs will also be required to have implemented policies, standard operating procedures, and participation processes consistent with standards established by the COV-HIE Governance Body.

Timelines for all these activities are detailed section 1.1.

2.6 Legal/Policy

2.6.1 Implementing the COV-HIE and Governance Body as a Legal Entity

As mentioned above, HITAC has decided to delegate the management of COV-HIE to a non-profit, non-membership organization within the Commonwealth. Also, the Governor of Virginia

will extend the duration of HITAC until September 2011 to enable a smooth and seamless transition to the non-profit entity, referred to here as the Governance Body.

Once the Governance Body has been selected by VDH via the contracting process, it will need to retain its own legal counsel to manage the Legal and Audit function as defined in Section 2.1. This will need to occur immediately, in Phase I of the implementation plan (January – July 2011).

The Legal and Audit function of the COV-HIE, once in place, will need to work with the Governance Body to determine a communications and review channel with the Commonwealth of Virginia Attorney General's Office. The state agency stakeholders participating in the Governance Body will need to also identify the proper liaison from the Commonwealth of Virginia Attorney General's Office to work with the COV-HIE Legal and Audit function, and to ensure that this liaison is properly informed and scheduled for this role. This is to ensure that there is constant communication between the Attorney General's office and the COV-HIE regarding state statutes that may materially affect the COV-HIE operations.

The Legal and Audit function will also be responsible for leading the effort to draft, implement and oversee compliance with policies and procedures as detailed below.

2.6.2 Policy and Procedures Creation and Implementation

The COV-HIE Governance Body will need to address two sets of policies and procedures: internal operating policies for the COV-HIE and network policies for the COV-HIE certified HIEs.

The internal operating policies govern the operations of the COV-HIE Governance Body and its oversight of the vendors that are operating the COV-HIE and related services such as the state MPI, Provider Locator Service, Record Locator Service, and other ancillary services. These policies include the following:

- Governance Body policies: these policies deal with the operations of the Governance Body, including Governance Body composition, terms and recruitment; committees and their membership and responsibilities, including the Operations Committee responsible for the direct oversight of the vendor operating the COV-HIE; meeting attendance, meeting agendas and minutes; and the interaction between the Governance Body and the Commonwealth.
- Finance policies: these policies deal with the financial operations of the COV-HIE, including annual and multi-year budgets; financial management and control; insurance and other liability protection; contracting with the vendor operating the COV-HIE and other vendors.
- Personnel policies: these policies deal with staffing of the COV-HIE and associated personnel issues.
- COV-HIE oversight: these policies address the oversight of the COV-HIE, including participation and operation metrics; and the policies for review and updating of COV-HIE network policies.
- Communications policies: these policies address recruitment of certified HIEs for the COV-HIE, outreach and education for providers and patients, assurances for compliance with

Freedom of Information Act requirements and mechanisms for regular reporting to stakeholders, and crisis response communications.

The COV-HIE network policies apply to certified HIEs of the COV-HIE. All COV-HIE certified HIEs must have certain policies and procedures in place and must sign a Trust Agreement in order to connect with the COV-HIE. These policies are described as:

- Certification of HIEs: these policies specify the application and certification process for entities that wish to connect to the COV-HIE, as well as the process for periodic review and re-certification.
- Oversight and dispute resolution: these policies deal with reporting required from COV-HIE certified HIEs, including metrics reporting and audits; oversight of compliance with the Trust Agreement; suspension and dispute resolution.
- Participation policies: these are policies that must be in place within COV-HIE certified HIEs wishing to connect to the COV-HIE, and include assurances for non-disclosure and privacy protection, patient notification policy; access, authentication and authorization; audit; data breach notification; acceptable network uses; and sensitive data policies
- COV-HIE Operations policies: these policies specify technical specifications, and privacy and security policies with which the COV-HIE operator must comply in its operations of COV-HIE.

The schedule for the creation and implementation of policies and procedures will have to be aligned with the schedule for the creation of the COV-HIE Governance Body, and for COV-HIE technology procurement and implementation. Policies and procedures for the COV-HIE Governance Body itself would have to be in place first; policies, procedures and applicable technical standards applicable to the operator of the COV-HIE will have to be in place before the vendor is selected.

Additionally, during Phase I the COV-HIE Governance Body will have to create a COV-HIE Trust Agreement, accompanied by a set of policies and procedures applicable to COV-HIE certified HIEs and a certification process that will enable HIEs to demonstrate that they are ready to join the COV-HIE. The COV-HIE Trust Agreement is expected to be modeled on the NHIN Data Use and Reciprocal Support Agreement (DURSA), but will need to be adapted specifically for the COV-HIE to assure compliance with state laws and regulations. The certification process and the policies and procedures that will need to be in place will also follow the national model and will take advantage of the relevant experience of other states, which are further along in their deployment of HIE.

After Phase II, the COV-HIE Governance Body will need to address ongoing maintenance of policies, procedures and agreements for the COV-HIE. The COV-HIE Governance Body will need to define factors that would trigger the review, and the processes for review and adoption of changes. Factors that might trigger a review and revision of agreements, policies and procedures include:

- New state or federal laws that materially impact governance or operation of COV-HIE or its certified HIEs
- New CMS guidelines for meaningful use of Health IT
- New NHIN technology standards, guidelines, or changes to the DURSA

There will be regularly scheduled communications between the Legal and Audit function and the COV-HIE Governance Body and advisory committees to determine any external factors which might necessitate changes. Once the Legal and Audit function drafts any policy changes necessary, they will be approved by the COV-HIE Governance Body. The Legal and Audit function will need to work with the Trust Enablement and Compliance functions within the Commonwealth HIE/HIO Core Services Contracted Operations layer of the COV-HIE organization to ensure the changes are implemented by all Participating Entities operating on the COV-HIE at the time.

2.7 Communications

To ensure transparency and accountability to stakeholders, the entity selected through the RFP process to serve as the Governance Entity for COV-HIE will be required to propose and implement a communications plan which includes the following elements:

a. development and delivery of educational materials to key stakeholder groups (consumers / patients, providers, government leaders, and public media) regarding the goals, status, benefits and return from the initiative, as well as process for participation
b. a plan for communications in the event of a breach, consistent with requirements for protection of privacy and security under the HITECH Act.
c. regular communication with and submission of required reports to the State HIT Coordinator, as well as with officials at the Virginia Department of Health, US Dept of Health and Human Services and other agencies charged with oversight of this ARRA-funded project
d. participation in national and multi-state regional coalitions which support coordination and collaboration with state-level HIE programs
e. effective support for coordination with COV-HIE customers, including reports on usage, performance measures and cost / benefit ratio

The work done by the HITAC Communications Committee during the planning phase will inform the decisions and work by the contracted Governance entity, as follows:

2.7.1 Environment Scan of Consumers to Determine Willingness and Levels of Participation in HIE

The COV-HIE proposes to conduct an environmental scan of consumers early in the implementation process, to gauge the level of awareness and comfort among consumers to participate in health information exchange. Developed by the members of HITAC's Communications Committee, with expertise from representatives of the National Patient Advocate Foundation, the Consumer Environmental Scan will aim to obtain responses from

2,500 consumers regarding their attitudes towards electronic sharing of personal health information: willingness to participate, purpose, authorized users, methods for giving consent and enforcement to assure appropriate use. The initial scan will be conducted in the 2nd quarter of 2011, using a combination of electronic (website and email), paper (distributed via provider and participating stakeholder organizations), and follow-up telephone surveys to assure adequate sampling of the demographic, geographic and special populations diversity within the Commonwealth. COV-HIE management will solicit proposals and contract with appropriate resources for the initial scan, to be followed at 12-month intervals to assure responsiveness to trends and / or changes in the environment. Findings will be communicated to stakeholders publicly via the project website, through annual reports and other general media releases, in support of evaluation metrics defined by the COV-HIE.

A draft questionnaire developed by the HITAC Communications Committee (see Appendix B) will be provided to COV-HIE management to be used and refined for use in this process.

2.7.2 Branding of the COV-HIE program

Since the COV-HIE program is new and must attract and retain customers (HIEs, IDNs, vendor-based solutions and other certified entities operating within the state), it is important to develop a brand which is easily recognizable and promotes broad adoption. It is therefore expected that the entity contracted to develop and manage COV-HIE services will build upon the work of the HITAC Communications Committee and the expertise offered by the Brand Center at Virginia Commonwealth University during the planning phase, to select a name, logo and tag line that effectively communicates the purpose, coverage area and service offerings. (See Appendix C)

2.7.3 Sample materials for use by providers enrolling patients to participate in COV-HIE

Because the option for patients / consumers to participate will be offered primarily through existing organizations which are certified to connect to COV-HIE, it is important that messaging materials, sample language and templates for enrollment be made available to providers who will be the primary means of distribution to patients. To reduce the burden that this may pose upon provider organizations, the entity contracted to develop and manage COV-HIE will be expected to engage professional expertise and in-kind resources to develop messaging materials for use by providers and program staff in informing users and participants about their options to participate (or not) in the COV-HIE. The RFP will be designed to allow respondents to propose strategies for developing and distributing this information, along with the timeline and resources allocated, as part of their proposed communications plan.

2.7.4 Measures of Success

As part of the proposed Communications Plan, the contracted entity will also be required to demonstrate its plan for evaluating and reporting both process and outcomes measures:

a. Development and distribution of informational materials to customers, providers and patients

b. Readiness and participation in health information exchange (e-scans)

c. Broad recognition and positive perception of COV-HIE brand

d. Compliance with legal and contractual requirements for reporting

2.8 Evaluation and Metrics

2.8.1 COV- HIE Production Metrics

In order to assess the impact on the COV-HIE on the stakeholder involved, the following list of process and outcome metrics were created to baseline, track and evaluate the outcome of the operational plan:

1. **Public Health**
   Chronic disease registries vs. targets

   Preventable hospitalization: pediatric asthma, heart failure, diabetes

   Health Maintenance registries vs. targets

   Screening rate: breast cancer, colorectal cancer, cervical cancer

   % organization with Immunization data exchange and % organizations sending/receiving all Immunization data electronically

   % organization with Quality Reporting (PQRI)

   % organization sending mandated lab reporting data and % organization sending all mandated reportable labs

   % organization electronically sharing medication management information

   For medication reconciliation

   For e-Prescription

   For order management

   Compare exchange vs. non-exchange organizations

   Adverse Drug Event (ADE) rate

   Adjusted Mortality rate

2. **COV-HIE ONC coordination**
   Congruence with ONC metrics and corrective actions needed/taken

   % Compliance with NHIN standards and corrective actions needed/taken

   # affiliated HIE and other state interoperability vs. expected # of HIEs

3. **Network**
   Diversity of information

   % of information exchanged electronically

   Categories of clinical information planned vs. provided

Number of gateway/trading partners projected vs. actively participating

% of organizations providing data vs. projected

% of data suppliers vs. data retrievers

4. **Technical**

Time processing messages

% exchange system uptime

# of downtime events of exchange network

# of periodic privacy and security audits completed vs. planned

# of security incidents reported

# of malicious successful exchange network penetrations

5. **Financial/Sustainability**

Profit/Loss statements (Balance sheets)

revenue generating services and revenue generated vs. planned

Volume of transaction directly generating revenue

Operational break-even timeframe progress and goal

6. **Stakeholder**

Frequency of access

% of registered users accessing system

Access per patient basis

and % of unique patients accessed

of unique visits/encounters accessed

Frequency of feature use

% encounters accessed

Usability/Adoption

Provider adoption and attitudes

Patient knowledge and attitudes

User Satisfaction

and % of provider opt-in and opt-out for patient

of members/participants

7. **Governance/Process**

Current operation mapped to original operation governance plan

Success rate hitting key milestones

Enhancement request by individuals

Workflow change and impact measures

Formal data sharing agreements executed amongst unique providers and HIEs across the state

Formal data sharing agreements executed amongst members from neighboring states

Strategic Plan									*Operational Plan*							
Service Category	**Service**	**Service Description**	**MU Stage 1 Requirement**	**Service Location**	**Patient Consent Required (Note 3)**	**Federal Standard**	**Technology Comments**	**Subscription Services**	**Phase I Core HIE Services Build**	**Phase II Pilot**	**Phase III**	**Phase IV**	**Phase V**	**How to Measure Success**	**Responsible Organization (Commonwealth or Vendor)**	**Service Type (Technical or Operational)**
								Mandatory for HIE	Jan 2011 - Jun 2011	July 2011 - Dec 2011	Jan 2012 - Jun 2012	Jul 2012 - Dec 2012	Jan 2013 - Dec 2013		Note: Refer to envisioned functional organization chart	
1. Integration Services																
Services supporting technical integration with the COV-HIE.	1.1 Patient Participation Process	Mechanism that allows patients to 'opt in' at the participating entity level to have their medical records accessible to authorized provider organizations. This service relies on the HIEs to handle the management of the patient consent.	Not required	Provider Level	No	None	NHIN - Access consent policy	Y	Include	Include				*Defined process is not labor/paper intensive. *Defined process not difficult for the patient.	Vendor: HIE/HIO Core Services Operations; Trust Enablement	Operational
	1.1.1 Global Opt Out Support	Mechanism (portal and help desk function) that allows patients to globally opt out of the COV-HIE. Global opt out is effective at a point in time going forward.	Not required	Central	No	None		Y	Include	Include				Patients can opt out of participation in the COV-HIE globally	Vendor: HIE/HIO Core Services Operations; Trust Enablement	Operational

1.1.2 HIE Opt Out Notification and Acknowledgement	Mechanism that allows the COV-HIE to notify HIE(s) when a patient has globally opted out. HIEs will acknowledge receipt of message.	Not required	Central	No	None		Y	Include	Include				HIE disables data sharing across HIEs and within their HIE for patients that have globally opted out.	Vendor: HIE/HIO Core Services Operations; Trust Enablement	Operational
1.2 Accreditation Process	Prescribed criteria that must be met in order to be allowed to participate as a registered HIE in the COV.	Not required	Central	No	None			Include	Include				Certify new entities (or deficiencies identified) as per SLA (within 3 business days)	Vendor: HIE/HIO Core Services Operations; Health Information Exchanges, Accreditation	Operational
1.2.1 SLA Monitoring	Service Level Monitoring (SLA) to insure the registration criteria is adhered to is an integral part of the QA process to insure the integrity, efficacy and security of the HIE data.	Not required	Central	No	None					Include			Use Service Level Methodology and measure and report on defined SLAs	Vendor: HIE/HIO Core Services Operations; Compliance	Operational
1.3 On-Boarding Process	Define a process for integrating new HIE's in the Commonwealth, which would include notices to the existing HIE's and testing scenarios to insure the success and seamless integration of these HIE's.	Not required	Central	No	NHIN On boarding			Include	Include				Collect lessons learned from pilot and identify needed changes/improvements.	Vendor: HIE/HIO Core Services Operations; Health Information Exchanges, On boarding	Operational

	1.4 Call Center/Service desk	Provide a 24 X 7 support system for the COV-HIE and the NHIN to provide timely resolution of problems, or serve as technical resource and liaison when questions arise.	Not required	Central	No	None			Include	Include				The ability to meet SLAs (Table 13, IDs #1,2,3)	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Operational
2. Core Services																
Services critical to operating the COV-HIE.	2.1 Master Patient Indexing (MPI) Service	Required central service that uniquely identifies a patient. The existence of an MPI record indicates that a patient has chosen to opt-in to the HIE model.	MU	Both	No	None	NHIN Arch Without NPI (XCPD)	Y	Include	Include				*The ability for valid matches meeting SLA (table 13 id# 4)Notes: A database of the unique identification numbers used by participating entities, as well a unique index number, known only to the HIE, for every patient for whom data have been created. The service employs probabilistic matching algorithms using data such as name, date of birth, gender, SSN, address, and other person identifiers collected by source systems.	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical

2.1.1 Patient Identity Resolution (non-match)	Managing the resolution of patient records that do not meet the matching criteria.	MU	Both	No	None		Y	Include	Include				*The ability to manually match or determination of uniqueness as per SLA (table 13 id#5)	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations; identify management	Operational
2.2 Record Locator Service	Identifies, for a given patient, which HIE's are authorized to provide health records for the patient.	MU	Both	No	None		Y	Include	Include				The ability to determine the location of patient data across multiple participating organizations and their clinical data systems as per SLA (table 2 id#1)	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
2.3 Security Service	All participants in the COV-HIE are required to follow established COV-HIE security policies and standards.	MU	Both	No	MITA, Technical Architecture, Chapter 8 - Technology Standards	*Strong passwords *Public Key Encryption *Hardware Tokens	Y	Include	Include					Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations; security	Technical
2.3.1 Authorization and Authentication Management	Provide a common, secure means to authorize and authenticate HIEs requesting information.	MU	Both	No	None		Y	Include	Include				The ability to manage digital certificates The ability to manage access rights The ability to manage user accounts	Vendor: HIE/HIO Core Services Operations; Trust Enablement; Privacy & security, Policies & Procedures	Operational

2.4 Transaction Management / Auditing	Maintain audit trail of all transactions received and processed by the requesting HIE and provider organization. All of the entities involved will be held to HIPAA and other standards. All access to patient records will be audited.	MU	Both	No	None		Y	Include	Include					Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
2.5 Connectivity to NHIN	Provide connection to the National Health Information Network (NHIN) to find patient records outside the state.	Not required	Both	No	NHIN On boarding	NHIN Gateway web services over HTTPS using PKI	Y	Include	Include					Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
2.6 Connectivity to Existing Virginia HIEs	Provide record review processes which include - querying of other HIEs for data about a patient, receipt of a list of specific documents available and query and return / display of a specific, individual provider chosen document. HIEs must support both the	Not required	HIE	No	None		Y		Interface to 1 VA HIE	Interface to other VA HIE				Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical

	initiation of and response to such queries.														
2.7 Maintain Directory Services (e.g. providers, hospitals, pharmacies, etc.)	Maintain gold standard list of providers, HIEs, pharmacies, etc. Respond to queries from HIEs looking to find basic information about particular entities.	MU	Central	No	None	IETF Lightweight Directory Access Protocol (LDAP) version 3.0	Y	Include	Include				Maintain a unique ID for each entity (and any national ID) and information about the entity's organization affiliation, role(s), privileges, and HIE certification and authority.	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Operational
2.7.1 Directory of Available Connections	Maintain index of COV-HIE certified HIEs. Notify HIEs of additions or removal of HIEs. Provide interface to NHIN or store records of other HIEs as required by NHIN standards.	Not required	Both	No	None		Y	Include	Include				*The ability to receive and respond to queries initiated by end users connected to The HIE.	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Operational

2.7.2 Patient Locator Service	Assist HIEs in locating patients by providing list of matching and near matching patients as part of initial query from HIEs. (See Provider Use Case example)	MU	Both	No	Part of FOA		Y	Include	Include				The ability to meet performance SLAs (table 2 id#1)	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
2.7.3 Provider Locator Service	Offer a Provider Locator Service to HIEs. HIE's will provide known information and return matching (or near matching) records containing basic information about the provider to the HIE.New providers will only be added as they are certified through official licensing processes.Offer a provider download service to newly certified HIEs.	MU	Both	No	None			Include	Include				The ability to meet performance SLAs (table 2 id#1)	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
2.7.4 HIE Locator Service	Maintain records of COV-HIE certified HIEs. HIEs will maintain records for certified provider organizations.	MU	Both	No	None			Include	Include				The ability to access member (enrollment) registry (part of VHEN & Medicaid administrative system on boarding)	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical

	2.8 Data Management [local cache of edge servers, edge server backups]	Follow practices to assure reliability of all indices and data (e.g. vaccination history, etc.) are maintained.	Not required	Both	No	None		Y				Include			Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
	2.9 Business Continuity	Insure business continuity. Follow standards for recoverability.	Not required	Both	No	None		Y			Include			The ability to recover/restart core services after outage as per SLA (table 11 id#5).	Vendor: HIE/HIO Core Services Operations; Compliance	Operational
	2.10 Secure Data Transfer	Securely transfer authorized data according to national standards.	MU	Both	No	None	IETF Transport Layer Security (TLS) 1.0 / Secure Socket Layer (SSL) Version 3.0	Y	Include	Include					Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations; Security	Technical
	2.11 Message Validation and Translation	Validate and provide message translation services, as required for transactions with HIEs.	MU	Both	No	None		Y	Include	Include					Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
3. Functional Services																
Basic and advanced functional services some of which are mandated by ONC in	3.1 Electronic eligibility and claims transactions	Provide functionality to exchange patient eligibility and health claim information among providers and payers	MU	HIE	No	Capability 140	ANSI X12 HIPAA transactions and code sets	Y	Include	Include				Part of the on boarding of VHEN & Medicaid	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical

the FOA.		according to national standards.													
	3.2 Electronic prescribing and refill requests	Utilize SureScripts to send e-prescribing transactions between prescribers, and pharmacies according to national standards.	MU	HIE	No	Capability 117, 118	SureScripts	Y	Include	Include					Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
	3.3 Prescription fill status and/or medication fill history	Utilize SureScripts to support electronic prescribing and refill requests, and prescription fill status and/or medication fill history according to national standards.	MU	HIE	Yes	Capability 117, 118		Y	Include	Include					Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
	3.4 Electronic clinical laboratory ordering and results delivery	Provide electronic clinical results delivery and exchange of orders including laboratory data according to national standards to enable the transfer of lab orders and	MU	HIE	No	Capability 126, 127 No Capability for Lab Ordering		Y	Include	Include					Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical

	results from labs or healthcare systems to providers.														
3.5 Clinical summary exchange for care coordination and patient engagement	Provide clinical summary data exchange for care coordination and patient engagement according to national standard formats (e.g. CCD)	Not required	HIE	Yes	Capability 119, 120		Y	Include	Include					Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
3.6 Radiology reports and images	Provide delivery of results between providers including lab and radiology results according to national standards.	Not required	HIE	Yes	None	DICOM	Y			Include				Vendor: HIE/HIO Operations; Technology and Technical Operations	Technical
3.7 Admission Face Sheets	Provide the ability to transfer admission face sheets	Not required	HIE	Yes	None		Y			Include				Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical

3.8 Clinical message services to provider portals		Not required	HIE	No	None		Y				Include			Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
3.9 Chart summaries to ER, hospitals, clinics, and providers		Not required	HIE	Yes	Capability 119, 120		Y	Include	Include					Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
3.10 Hospital discharge and transfer data, reports and summaries to other providers		Not required	HIE	Yes	Capability 119, 120	HL7 - XML/CDA	Y	Include	Include					Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
3.11 Provider-to-Provider Communications	Manage communications for coordination of care (e.g. electronic referrals, consults, transitions in care, etc.)	Not required	HIE	No	None		Y			Include				Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
3.12 Image Exchange	Manage image exchange functions.	Not required	HIE	Yes	None							Include		Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical

	3.13 Scheduling	Manage scheduling functions.	Not required	HIE	No	None							Include		Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
	3.14 Auditing and Accountability	Manage audit trail for all activities (transactions).	Not required	Both	No	None		Y			Include			The ability to support the recording of transactions and associated security related data as well as the capability to review such recordings	Vendor: HIE/HIO Core Services Operations; Compliance	Operational
	3.15 Provider portal	A provider portal that supports read only access to patient records. This is intended for supporting better patients care until meaningful use can be achieved by all practioners.	Not required (in any stage)	Central	No	None							Include	The ability for providers without technology to access the electronic medical records for their patients as an aid to patient care on the road to meaningful use.	Vendor: HIE/HIO Core Services Operations: provider and participant services	Both
4. Reporting Services																
Services meeting the reporting needs of the COV-HIE.	4.1 State Reporting Services	Reporting services for electronic submission of state mandated reports.	Not required	HIE stores data, COV-HIE builds report	No	None		Y			Include			When the report is available.	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
	4.1.1 Electronic public health reporting	Capability to submit electronically state mandated public health reports.	MU #12, #24-25	HIE stores data, COV-HIE builds report	No	Interoperability Spec 11		Y	Include	Include				When the report is available.	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical

4.1.2 Quality reporting	Capability to submit electronically state mandated quality reports (e.g. PQRI reports and meaningful use CMS reporting).	MU #12	HIE stores data, COV-HIE builds report	No	Capability 130		Y	Include	Include				When the report is available.	Vendor: HIE/HIO Core Services Operations; Provider and Participant Services	Operational
4.1.3 Immunization and other public health initiatives	Capability to submit electronically state mandated immunization registries and reports.	MU #24	HIE stores data, COV-HIE builds report	No	None		Y	Include	Include				When the report is available.	Vendor: HIE/HIO Core Services Operations; Compliance	Technical & Operational
4.1.4 State-mandated reportable lab results	Capability to submit electronically state mandated reportable lab results.	MU #25	HIE stores data, COV-HIE builds report	No	None		Y	Include	Include				When the report is available.	Vendor: HIE/HIO Core Services Operations; Compliance	Technical & Operational
4.1.5 State-mandated Syndromic Surveillance Data	Capability to submit electronically state mandated syndromic surveillance data.	MU #26	HIE stores data, COV-HIE builds report	No	None		Y	Include	Include				When data are available.	Vendor: HIE/HIO Core Services Operations; Compliance	Technical & Operational
4.1.6 Support advance directives	Maintain a record of a patient's Advance Directives.	Not required	Central	No	None		Y				Include		When data are available.	Vendor: HIE/HIO Core Services Operations; Provider and Participant Services	Technical
4.2 Subscription / Notification Service	Reporting services for optional electronic submission of data.	Not required	HIE	No	None					Include				Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical

4.2.1 Disease Management	These services may include commonly mandated reports for healthcare, as well as Geocoded population summary exchange (GIPSE) and Health Information Event Messaging (HIEM).	Not required	HIE	Yes for clinical reports, No for mandated by the State or Federal government	None	Geocoded Population Summary Exchange (GIPSE); Health Information Event Messaging (HIEM)				Include				Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
4.2.2 Geographic Reporting	Link clinical data from all providers within a geographic area to provide sub-regional reporting	Not required	HIE	No	None						Include			Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
4.2.3 Fraud Prevention & Detection	Provide reporting services such as establishing a provider's legal record, or build an evidence trail	Not required	HIE	No	None							Include		Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
4.2.4 Patient based personal health report available to patient	Provide the provision of an aggregated Personal Health Record to the patient.	Not required	HIE	No	None							Include		EMR vendor	Technical

	4.3 Anonymization of protected data	Provide for de-identification of data presented for aggregate reports through an algorithm that can convert a person's identity into a meaningless code, and then convert the code back again to re-identify the person when necessary. De-identification must meet all HIPAA regulations.	Not required	Both	No	None		Y			Include			The ability to disguise protected health information. Notes: A service that employs an algorithm that can convert a person's identity into a meaningless code, and then convert the code back again to re-identify the person, when necessary.	Vendor	Technical & Operational
5. Decision Support Services																
Services meeting the advanced analytical needs of the COV-HIE.	5.1 Advanced clinical decision support service	Pull and aggregate authorized data for analysis in order to provide datasets or reports (e.g. Isabel, Quick Medical Reference, and Differential Diagnosis Suggestions)	Not required	Both	No	None							Include	When the analytical service is available.	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical
	5.2 Preventive care service	Epidemological studies, including geographic studies.	Not required	Both	No	None							Include	When the analytical service is available.	Vendor: HIE/HIO Core Services Operations; Provider and Participant Services	Operational

	5.3 Other reporting / decision support / business management services	Advanced ad hoc analysis e.g. Community Health Information Sources	Not required	Both	No	None							Include	When the analytical service is available.	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical & Operational
	5.3.1 Epidemic Management	State or federal ad hoc patient or population based epidemic analysis looking for signs of incidence.	Not required	Both	No	None							Include	When the analytical service is available.	Vendor: HIE/HIO Core Services Operations; Provider and Participant Services	Operational
	5.3.2 Outcomes Management	Near real-time alerts about trends and outcomes.	Not required	Both	No	None							Include	When the analytical service is available.	Vendor: HIE/HIO Core Services Operations; Provider and Participant Services	Operational
6. Infrastructure / Utility																
Services provided through the technical architecture of the COV-HIE.	6.1 Knowledge Management	Provide electronic knowledge resources, information and published literature (e.g. MedLine, Up to Date, AMA, and Micromedix). Requires negotiating state licensing.	Not required	Both	No	None	OPEN Source						Include	When data is available.	Vendor: HIE/HIO Operations; Technology and Technical Operations	Operational
	6.2 Enterprise Vocabulary Management	Require standardized vocabularies that follow national standards to achieve semantic	MU	HIE	No	FHA, HIT Standards Panel		Y	Include	Include				All participating HIE systems adopting standardized medical vocabulary (SNOMED) and healthcare	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Operational

		interoperability.											standards (UMLS Metathesaurus which includes over 100 constituent vocabularies).		
	6.3 Technical Infrastructure	The commercial technical infrastructure is a service oriented architecture (SOA) framework. The technical infrastructure and operational performance will be managed through Service Level Agreements (SLAs)	Required	Both	No	MITA, Technical Architecture, Chapter 8 - Technology Standards	SOA		Include	Include			*Alignment with MITA principles, goals, and objectives (MITA IT Architecture Framework V2.0, Part III Technical Architecture, Chapter 2 - MITA principles, goals, and objectives)*Use of SOA technology (MITA IT Architecture Framework V2.0, Part III Technical Architecture, Chapter 2 - SOA concept)*Alignment with MITA security and privacy goals (MITA IT Architecture Framework V2.0, Part III Technical Architecture, Chapter 6 - Technical Services)*Align	Vendor: HIE/HIO Core Services Operations; Technology and Technical Operations	Technical

														ment with MITA technology standards (MITA IT Architecture Framework V2.0, Part III Technical Architecture, Chapter 8 - Technology Standards)		

NOTES:

1. Service Level Agreements must be defined and will determine choices for the technical infrastructure (e.g. location on edge servers).
2. Column D - Service Location describes where the service will be performed (central - state level, HIE - local or regional level, Both - some portion of the service performed at both state and HIE level)
3. Patient Consent Required Column - Yes = data will be shared across the network if the patient opts in. No= by default the data will be shared without actively needing to collect patient consent.
4. Service 3.3 does not include the Prescription Monitoring Program that collects data from pharmacies and is managed by the Department of Health Professions.

Appendix B: Consumer Environmental Scan

Background: Information from healthcare consumers about their preferences and opinions about electronic health information exchange can help inform decisions regarding privacy and security, functions and branding of the statewide effort to advance sharing and meaningful use of electronic health information.

In addition to the environmental scans conducted for providers, hospitals and managed care organizations, the HITAC Communications Committee recommended that a similar environmental scan of consumers / patients be conducted, to assure that the perspectives of consumers and patients be adequately considered and reflected in the statewide HIE strategic and operational plans, including the identification of region-specific issues and concerns.

The HITAC Communications Subcommittee has developed a short list of consumer focused environmental scan questions to be gathered via a paper polling process and an electronic (web) polling process. As a means of segmenting the data by health region, the respondent's zip code is to be collected.

The HITAC Communications Subcommittee recommends that the entity contracted to provide Governance services to the COV-HIE be contractually required to conduct an environmental scan for consumers, with a suggested timeframe for the scan to be conducted over a 30-day period in the 1st quarter of 2011, repeated at a 12-month period(s) thereafter to allow comparison of changes in attitudes based on increased awareness and participation in health information exchange.

Purpose: to gather information from 2500 adult (age 18 and older) consumers / patient / clients representing a proportionate sampling from the geographic regions of the Commonwealth, regarding their willingness to allow electronic exchange of their personal health information, so that responses can be compiled and reported for use by policy-makers charged with development and oversight of health information exchange initiatives operating in the Commonwealth of Virginia. Specific outreach to special populations (minority, non-English-speaking and persons receiving behavioral health services) should be included to assure adequate representation among respondents.

Proposed Methodology:

a) distribute up to 15,000 surveys via print (direct mail and distribution through providers, partner organizations, events, etc), email and websites.
b) within 10 days, follow up with phone calls as needed to assure representative sample
c) aggregate results, sorted by geographic region and frequency of use for healthcare services
d) repeat at least once within a 12-month period to determine changes, trends

Timeframe:

3rd quarter 2010: prepare and issue RFP for contracted resources to provide project management

4th quarter 2010: review proposals and recommend contractor

1st quarter 2011: upon approval of Strategic & Operational Plan by ONC: execute contract

2nd quarter 2011: distribute and follow-up to survey over 30-day period

2nd quarter 2011: compile and report findings over 2 week period

3rd quarter 2011: adjust communications and other strategies to address findings and recommendations

2nd quarter 2012: repeat survey over 30-day period, compile and report findings

COV-HIE Consumer Environmental Scan – questionnaire

As part of the effort to improve the health of citizens in the Commonwealth of Virginia, the Governor has appointed a Health Information Technology Commission to recommend a means of exchanging health information to facilitate the coordination of care, to improve health outcomes and to deliver services more cost-effectively. Commission members appreciate your thoughts to help guide the development of strategies, policies and infrastructure that meets the expectations of citizens and users of electronic health information.

1. What is your zip code?

2. What benefits do you perceive from the electronic exchange of health information?

3. What risks do you perceive from the electronic exchange of health information?

4. Would you allow the following types of information to be shared among your health professionals, for the purpose of coordinating and improving the delivery of health services to you?

Yes	No	
___	___	name, address, phone, date of birth
___	___	emergency contact (family member / legal guardian)
___	___	social security number
___	___	payment information (health plan, health savings account, credit card or other)

___ ___ past history for health issues (childhood, previous illness or injury)

___ ___ list of current medications, including vitamins, over the counter medications and herbal supplements

___ ___ allergies

___ ___ names of physicians or other health professionals from whom you receive care

___ ___ preferred choices for pharmacy, lab, diagnostic tests, ambulance, inpatient services

___ ___ mental health diagnosis / treatment history

___ ___ sexually-related diagnosis / treatment history

___ ___ infectious disease history (tuberculosis, hepatitis, HIV / AIDS, other)

___ ___ chronic disease history (diabetes, cancer, other)

___ ___ family history of disease

___ ___ advanced directives (living will, power of attorney, etc.)

___ ___ all of the above

5. To whom would you give permission to view your information? (*check all that apply)*

___ to doctors who are responsible for my personal health care services

___ to nurses or other office staff who assist my doctor

___ to my pharmacist

___ to technicians in laboratories, imaging centers, clinics

___ to home health agencies / caregivers

___ to emergency responders

___ to public health officials responsible for tracking disease outbreaks, bio-terrorism, public health dangers

___ to organizations conducting research for clinical purposes (comparing effectiveness of medical treatments, drugs, devices, etc.)

___ to persons tracking and reporting quality measures

___ to persons tracking and reporting cost-efficiency measures

___ to those responsible for payment of my health care (health plan)

___ to family members who would make decisions if I am incapacitated

6. What methods would you prefer to give your permission? *(check all that apply)*
   - ___ sign paper form at doctor's office, hospital, pharmacy, clinic, etc.
   - ___ sign paper form at other location (mall kiosk, etc.)
   - ___ sign up online

7. What kinds of information in your records would you expect to be able to view? *(check all that apply)*
   - ___ list of all who have viewed my records (stamped with date and time of access, list of information viewed)
   - ___ all information in my records
   - ___ records related to the following:
     - ___ scheduling info
     - ___ billing / payment info
     - ___ test results
     - ___ prescriptions
     - ___ explanations of options for care and treatment
     - ___ reminders of appointments and treatment
     - ___ responses to questions that I ask my health professional
     - ___ other (please specify)
     - ___ all of the above

8. What types of information would you like to send electronically to your healthcare professional? *(check all that apply)*
   - ___ scheduling requests
   - ___ payment
   - ___ updated address, phone, emergency contact
   - ___ advanced directives (living will, etc.)
   - ___ questions about my health status
   - ___ questions about treatment options
   - ___ other (please specify)

9. Who is responsible for protecting the security and confidentiality of my information? *(check all that apply)*

___ I am

___ my healthcare professional

___ system administrators

___ state / federal government

___ other (please specify):

10. What should be the penalties for release / access of information without permission? *(check all that apply)*

___ reprimand, retraining of employee

___ firing of employee

___ loss of professional certification, license or credentials

___ loss of business license for organization

___ civil charges, fines

___ criminal charges, time in jail

___ other (please specify):

11. How would someone best communicate with you about electronic exchange of your health information? *(check all that apply)*

___ verbal explanation at my healthcare facility

___ written explanation at my healthcare facility

___ online website for information

___ general media information

___ direct mail from my healthcare professional

___ other (please specify):

12. Are there any other comments that you would like to share?

Thank you for taking time to share your opinions and ideas with us!

For more information, please contact:

Name, Title

phone

email

Appendix C: COV-HIE Brand Input and Options

An official name needs to be selected for the Commonwealth statewide HIE to allow further branding related activities (i.e. logo, templates, marketing materials) to be developed.

Background:

The VCU Branding Center assisted in gathering input from members of the HITAC Communications Committee, as well as from members of the Commission and general public, to create a brand name for Virginia's proposed HIE, to be used in multiple contexts to describe slightly different aspects of the brand. Specifically, the HIE can be seen as:

- An Object. The connections, servers, infrastructure, wiring, and physical pieces of the HIE. When we describe that the HIE is a backbone or system or network, we are referring to the brand as an object.
- Information. The collective clinical data that is contained within the HIE. This is the most essential part of the brand and the HIE's task. The objective is not simply sharing, or creating the structures that allow us to share, but sharing patients' clinical data.
- A Company. It is expected that the HIE will be incorporated as a 501(c)(3) non-profit. Although we are naming the system and its information, it would be advantageous if the name were also used for the corporate entity itself.

How the name will be used is also a consideration. As the name is introduced, different audiences will adopt it at different times. A likely order (timeline) of adoption will be: Volunteers, Government Representatives and the Media; Administrators of the system as it is being implemented; Providers as the HIE is being populated and used; Patients who encounter the HIE through their provider.

Some of our options are simple and functional, some playful and memorable, some connote technology or health, and there is an Alphabet Soup of other options. Each name has strengths and weaknesses in one or more areas. Ideally, the Commission's selection will satisfy as many of the above criteria as possible.

Finally, although this is not part of our stated goals, it would also be nice if the name, as well as the HIE itself, were a model that could be followed by the rest of the nation.

The HITAC Communications Subcommittee reviewed several name options proposed by the VCU Branding Center, along with some ideas for logos. Input from those sessions will be provided to the entity contracted to provide governance for the COV-HIE, for consideration as they select the name, logo and marketing messages for the program.

Share

Virginia

Medical

Records

Share

Secure

Accurate

Safe

Complete

Network

Backbone

Just enough

Bone

Skeleton

Data

Connect

Now

Access

Transmit

Send

Store

One stop shop

Privacy

Exchange

Share

21st Century

Link

Better

Vault

Key

Accurate

Concise

Efficient

Convenient

Pneumatic Tubes

Tech

Handy

Direct

Line

Mechanics

Available

Application

System

Collaborative

Co-op

Consortium

Passport

Confidential

Gazelle

Pyramid

Hermes

Electronic

Virginia

History

Commonwealth

Bill of Rights

Freedom

Minerva

Liberty

Medical

Stat

RX

Doctors

Caregivers

Wellness

Lifesave

History

Hippocrates

Care

Health

The art is Long

Clinical

Disease Management

Life

Shots

Immunize

Vital

Prevention

Well

Patient

Records

Charts

Stats

Packets

Messaging

Documents

Statistics

Network

Backbone

MedChart Va.

Ix = information

Vital Stats

Folder

Information

Picture

ICE

Database

Credit Report

Combined

VAChart

iHealth

Healthix

Health Data Exchange

Chartex

Clean Bill of Health

Health Bill

Bill of Health Rights

Rights Xchange

v-Health

v-Care

v-Net

Tech Rx

ICEdirect

ICEline

ICEtech

ICEx

VA Health Card

VA Health Report

Shared Health Record

HealthRex

LifesaverRX

HealthKey

MedicalExchange

MedDirect

MedRx

Medi-ready

Medline

MedOnline

MedTech

MyDocs

MyHealthDocs

MyHealthyVa

MyHealth

Patient confidential

PatientMedTech

Patient Rx

Privacy Rx

PrivacyNet

MyChart

MyStats

RxVA

SafeStats

HealthSafe

ClinicRx

HealthyLinks

VaHealthyLinks

VaMedTech

EZhealth

Vital Stats

HealthStats

HealthWorld

Vital Virtual

WellMedTech

WellRx

WellTech

CommonHealth

ClinEx

CARE

Health Virginia

Healthy Virginia

Connected Health

Virginia Health Net

MyHealthData

BetterHealth

Virginia Health Exchange

Committee members feel that adding either Virginia or Commonwealth helps to define the program, although there may be some implications if geographic limitations are proscribed by the name. Among the preferred options for names were the following:

OneChart

Vital Virginia

Vitality/Vital-IT

Med Share

Health Chart

VA Health Exchange Network

LifeChartVirginia

VitalChart (Virginia)

VA Healthnet

Stat-vita

Use of Commonwealth as opposed to Virginia

Four logos were considered for graphic design, color, font and fit with the name Vitality. Several mentioned that the first logo suggested a "V", which could be designed for Vitality and Virginia. The preferred colors were blue to incorporate the Virginia flag and orange.


VA VITALITY


Va Vitality

Acronym	Name	Description
AHIMA	American Health Information Management Association	• The American Health Information Management Association (AHIMA) is the premier association of health information management (HIM) professionals. • AHIMA's more than 57,000 members are dedicated to the effective management of personal health information required to deliver quality healthcare to the public. • Founded in 1928 to improve the quality of medical records, AHIMA is committed to advancing the HIM profession in an increasingly electronic and global environment through leadership in advocacy, education, certification, and lifelong learning.
ARRA	American Recovery and Reinvestment Act	Recovery Act has three immediate goals: • Create new jobs and save existing ones • Spur economic activity and invest in long-term growth • Foster unprecedented levels of accountability and transparency in government spending The Recovery Act intends to achieve those goals by: • Providing $288 billion in tax cuts and benefits for millions of working families and businesses • Increasing federal funds for education and health care as well as entitlement programs (such as extending unemployment benefits) by $224 billion • Making $275 billion available for federal contracts, grants and loans • Requiring recipients of Recovery funds to report quarterly on how they are using the money. All the data is posted on Recovery.gov so the public can track the Recovery funds.
ATO	Authority to Operate	Authority to Operate refers to the sanction given to the participating entity by the COV-HIE to connect and operate on the COV-HIE after successfully completing the COV-HIE accreditation and onboarding process.
C&A	Certification & Accreditation	A process that ensures that systems and major applications adhere to formal and established security requirements that are well documented and authorized
CAQH	Council for Affordable Quality Healthcare	an unprecedented nonprofit alliance of health plans and trade associations, is a catalyst for industry collaboration on initiatives that simplify healthcare administration
CAT	Computer Adaptive Testing	A form of computer-based test that adapts to the examinee's ability level

CCD	Continuity of Care Document	The Continuity of Care Document (CCD) is built using HL7 Clinical Document Architecture (CDA) elements and contains data that is defined by the ASTM Continuity of Care Record (CCR). It is used to share summary information about the patient within the broader context of the personal health record.
CCR	Continuity of Care Record	A standard specification being developed jointly by ASTM International, the Massachusetts Medical Society (MMS), the Health Information Management and Systems Society (HIMSS), and the American Academy of Family Physicians (AAFP).
CDA	Clinical Document Architecture	An XML-based markup standard intended to specify the encoding, structure and semantics of clinical documents for exchange
CHI	Consolidated Health Informatics	A collaborative effort to adopt health information interoperability standards, particularly health vocabulary and messaging standards, for implementation in federal government systems. About 20 department/agencies including the Department of Health and Human Services, the Department of Defense and the Department of Veterans Affairs are active in the CHI governance process.
CMS	Centers for Medicare and Medicaid Services	A federal agency within the United States Department of Health and Human Services (HHS) that administers the Medicare program and works in partnership with state governments to administer Medicaid, the State Children's Health Insurance Program (CHIP), and health insurance portability standards (HIPAA)
COB	Coordination of Benefits	Coordination of benefits is a practice which is used to ensure that insurance claims are not paid multiple times when someone is insured under multiple insurance plans.
Consumer	Consumer	Any actual or potential recipient of health care, such as a patient in a hospital, a client in a community mental health center, or a member of a prepaid health maintenance organization
COOP	Continuity of Operational Plan	Preparations and institutions maintained by the United States government, providing survival of federal government operations in the case of catastrophic events
COV-HIE	Commonwealth of Virginia Health Information Exchange	A services gateway to be created under contract from VDH to a non-profit Governance Body and various technology and services vendors to serve the health information exchange needs of all stakeholders in the Commonwealth of Virginia. COV-HIE is a temporary name, the contracted

		Governance Body will define official name and branding for the network.
CPT	Current Procedural Terminology	A code set that is maintained by the American Medical Association. The CPT code set accurately describes medical, surgical, and diagnostic services and is designed to communicate uniform information about medical services and procedures among physicians, coders, patients, accreditation organizations, and payers for administrative, financial, and analytical purposes.
CRM	Customer Relationship Management	An information industry term for methodologies, software, and usually Internet capabilities that help an enterprise manage customer relationships in an organized way.
DCLS	Division of Consolidated Laboratory Services	First consolidated laboratory in the nation and offers a wide variety of analytical testing in support of state programs
DICOM	Digital Imaging and Communications in Medicine	A standard for handling, storing, printing, and transmitting information in medical imaging. It includes a file format definition and a network communications protocol.
DMAS	Department of Medical Assistance Services	DMAS is the agency that administers Medicaid and the State Children's Health Insurance Program (CHIP) in Virginia.
DR	Disaster Recovery	The process, policies and procedures related to preparing for recovery or continuation of technology infrastructure
DURSA	Data Use and Reciprocal Support Agreement	A comprehensive, multi-party trust agreement that will be signed by all NHIN Health Information Exchanges (NHIEs), both public and private, wishing to participate in the Nationwide Health Information Network. The DURSA provides the legal framework governing participation in the NHIN by requiring the signatories to abide by a common set of terms and conditions.
E- scan	Environmental Scan	Process of gathering, analyzing, and dispensing information for tactical or strategic purposes
EHR	Electronic Health Record	A longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting, including patient demographics, progress notes, problem lists, vital signs, past medical history, review of systems, immunizations, laboratory data, radiology reports, and other components of medical records
ELC	Epidemiology and Laboratory Capacity	Assisting state and eligible local public health agencies to strengthen their basic epidemiologic and laboratory capacity to address infectious disease threats

EMR	Electronic Medical Record	A computerized legal medical record created in an organization that delivers care, such as a hospital and doctor's surgery
ePHI	Electronic Protected Health Information	Recorded information in any format regarding the physical or mental condition of an individual, health care provision, or health care payment. It contains demographic information able to specifically distinguish an individual. See also health information, individually identifiable
ESB	Enterprise Service Bus	Consists of a software architecture construct which provides fundamental services for complex architectures via an event-driven and standards-based messaging-engine (the bus)
FHA	Federal Health Architecture	Helping build a federal health information technology environment that is interoperable with private sector systems and supports better point-of-service care, increased efficiency and improved overall health in the U.S. population
FOA	Funding Opportunity Agreement	A publicly available document by which a Federal Agency makes known its intentions to award discretionary grants or cooperative agreements, usually as a result of competition for funds
FQHC	Federally Qualified Health Centers	Public and private non-profit health care organizations that meet certain criteria under the Medicare and Medicaid Programs (respectively, Sections 1861(aa)(4) and 1905(l)(2)(B) of the Social Security Act and receive funds under the Health Center Program (Section 330 of the Public Health Service Act).
GIPSE	Geocoded Interoperable Population Summary Exchange	A data format created by the U.S. Centers for Disease Control and Prevention (CDC) to allow the electronic exchange of health condition/syndrome summary data that has been stratified by a number of variables, including geography.
HIE	Health Information Exchange	The mobilization of healthcare information electronically across organizations within a region, community or hospital system
HIEM	Health Information Event Messaging	Defines the messages used for one NHIE to subscribe to content from another NHIE, and to notify another NHIE about that content
HIMSS	Healthcare Information and Management Systems Society	A comprehensive healthcare-stakeholder membership organization exclusively focused on providing global leadership for the optimal use of information technology (IT) and management systems for the betterment of healthcare.
HIO	Health Information Organization	Group of organizations within a specific geographical area that share healthcare-related information electronically according to national

		standards
HIT I-APD	Health Information technology Implementation Advance Planning Document	Plan of action that requests Federal matching funds and approval to acquire and implement the proposed SMHP services, equipment, or both.
HITAC	Health Information Technology Advisory Commission	Consists of members appointed by the chair in consultation with the Secretary of Technology and represents broad stakeholder engagement in health information technology and exchange
HITECH	Health Information Technology for Economic and Clinical Health Act	Federal Act that amends Public Health Service Act by adding a number of funding opportunities to advance health information technology. The Act seeks to improve American health care delivery and patient care through an unprecedented investment in health information technology.
HITSAC	Health Information Technology Standards Advisory Committee	Advises the Information Technology Investment Board (ITIB) on the approval of nationally recognized technical and data standards for HIT systems or software
HITSP	Health Information Technology Standards Panel	Serve as a cooperative partnership between the public and private sectors for the purpose of achieving a widely accepted and useful set of standards specifically to enable and support widespread interoperability among healthcare software applications, as they will interact in a local, regional and national health information network for the United States.
HRSA	Health Resources and Services Administration	Is the primary Federal agency for improving access to health care services for people who are uninsured, isolated or medically vulnerable
ICD	Interface Control Document	Describes the interface of interfaces to a system or subsystem
IDN	Integrated Delivery Network	A network of facilities and providers working together to offer a continuum of care to a specific market or geographic area
IETF	Internet Engineering Task Force	Make the Internet work better by producing high quality, relevant technical documents that influence the way people design, use, and manage the Internet.
ITAC	Information Technology Advisory Council	An advisory council within in the executive branch of the Commonwealth of Virginia state government. The ITAC is responsible for advising the CIO and the Secretary of Technology on the planning, budgeting, acquiring, using, disposing, managing, and administering of information technology in the Commonwealth.
LDAP	Lightweight Directory Access	Is an Internet protocol that email and other

	Protocol	programs use to look up information from a server
LIMS	Laboratory Information Management Systems	A software system used in laboratories for the management of samples, laboratory users, instruments, standards and other laboratory functions such as invoicing, plate management, and workflow automation.
LOINC	Logical Observation Identifiers Names and Codes	Facilitate the exchange and pooling of clinical results for clinical care, outcomes management, and research by providing a set of universal codes and names to identify laboratory and other clinical observations
MEGAHIT	Medical Evidence Gathering through Health Information Technology	System maintained by the Social Security Administration that receives and evaluates electronic clinical documentation for disability claims.
MITA	Medicaid Information Technology Architecture	A national framework supporting improved systems development and health care management for the Medicaid enterprise
MMIS	Medicaid Management Information System	An integrated group of procedures and computer processing operations (subsystems) developed at the general design level to meet principal objectives
MPI	Master Patient Index	The MPI system is characterized by a structured format that permits instantaneous access to medical patient records and eliminates all paper medical records, allowing accurate, quick documentation and retrieval of patients' visits.
NCPDP	National Council for Prescription Drug Programs	A not-for-profit ANSI-Accredited Standards Development Organization representing virtually every sector of the pharmacy services industry
NHIE	Nationwide Health Information Exchange	A health information exchange that has been duly certified and authorized by ONCHIT to operate on the Nationwide Health Information Network.
NHIN	Nationwide Health Information Network	Set of standards, services and policies that enable secure health information exchange over the Internet.
NLM	National Library of Medicine	The world's largest medical library, operated by the United States government under the National Institutes of Health. NLM's involvement in Health IT is primarily in the clinical vocabularies space (SNOMED CT, LOINC, RxNorm) and has developed UMLS (Unified Medical Language System) to assist computer systems in properly "understanding" the language of medicine and biomedical research.
NLR	National Level Repository	Used to track incentive payments to heath care providers that adopt electronic health records

		and modernize their computer systems.
NTIA	National Telecommunications and Information Administration	An agency in the U.S. Department of Commerce that serves as the executive branch agency principally responsible for advising the President on telecommunications and information policies
Patient	Patient	A recipient of a health care service, a health care recipient who is ill or hospitalized, a client in a health care service
PCP	Primary Care Provider	A physician/medical doctor who provides both the first contact for a person with an undiagnosed health concern as well as continuing care of varied medical conditions, not limited by cause, organ system, or diagnosis
PHL	Public Health Laboratories	Provide diagnostic testing, disease surveillance, applied research, laboratory training and other essential services to the communities they serve
PHR	Personal Health Record	A health record that is initiated and maintained by an individual
PIX ITI	Patient Identity Cross Reference Information Technology Infrastructure	Identifying and cross-referencing different attributes for the same patient
PKI	Public Key Infrastructure	A set of hardware, software, people, policies, and procedures needed to create, manage, distribute, use, store, and revoke digital certificates
PLDB	Patient Level Database	Includes patient demographic, administrative, clinical, and financial information on every discharge that occurs in Virginia licensed hospitals
PMO	Project Management Office	A business or professional enterprise is the department or group that defines and maintains the standards of process, generally related to project management, within the organization
PPCP	Priority Primary Care Provider	Defined in the Virginia HIT Regional Extension Center contract with ONC as providers practicing internal medicine, family practice, Ob/Gyn and pediatrics in groups of 10 or fewer, unless they serve uninsured/underinsured patients
QIO	Qaulity Improvement Organizations	Improve the effectiveness, efficiency, economy, and quality of services delivered to Medicare beneficiaries.
QoC	Quality of Care	Metric typically associated with measuring patient outcomes, positive or negative. Can be gathered for purely statistical analyses or as part of a program of continuous improvement in healthcare provider or payer organizations.
RFP	Request for Proposal	"Official" statement to vendors about the services you require

RLS	Record Locator Service	Holds information authorized by the patient about where authorized information can be found, but not the actual information the records may contain.
RPO	Recovery Point Object	The maximum acceptable level of data loss following an unplanned "event", like a disaster (natural or man-made), act of crime or terrorism, or any other business or technical disruption that could cause such data loss.
RTO	Recovery Time Objective	A period of time within which business and / or technology capabilities must be restored following an unplanned event or disaster.
SDE	State Designated Entity	In reference to the contractual relationship between a state and ONCHIT for the funding grants for statewide health information exchange, when a state abdicates contractual control of the funding and statewide health information exchange to a third party, typically an existing Health Information Exchange within the state. The Commonwealth of Virginia does NOT have an SDE. The responsible agency to ONCHIT for the duration of grant funding being received for statewide health information exchange is the Virginia Department of Health.
SDO	Standards Development Organization	Primary activities are developing, coordinating, promulgating, revising, amending, reissuing, interpreting, or otherwise maintaining standards that address the interests of a wide base of users outside the standards developing organization
SLA	Service Level Agreement	A part of a service contract where the level of service is formally defined
SMHP	State Medicaid HIT Plan	A plan describing how a state's Medicaid Services agency intends to implement and promote Health IT, especially in light of meaningful use requirements as defined by CMS.
SMTP	Simple Mail Transfer Protocol	An Internet standard for electronic mail (e-mail) transmission across Internet Protocol (IP) networks
SNOMED	Systemized Nomenclature of Medicine	A multiaxial, hierarchical classification system
SOA	Service Oriented Architecture	A flexible set of design principles used during the phases of systems development and integration
SOAP	Simple Object Access Protocol	A protocol specification for exchanging structured information in the implementation of Web Services in computer networks
SPHL	State Public Health Lab	Provide diagnostic testing, disease surveillance, applied research, laboratory training and other essential services to the communities they serve

SS-A	State Self- Assessment	The process by which a state performs an assessment of health IT maturity in both the public and private sector within its borders. Can also be referred to as an environmental scan.
SSL	Security Socket Layer	Cryptographic protocols that provide security for communications over networks such as the Internet
TEO	Trust Enabling Organization	An organization specifically charged with creating and maintaining a framework of trust with its clients, patients of the clients, and other stakeholder and trading partners.
TLS	Transport Layer Security	Cryptographic protocols that provide security for communications over networks such as the Internet
UDDI	Universal Description Discovery and Integration	A platform-independent, Extensible Markup Language (XML)-based registry for businesses worldwide to list themselves on the Internet
UMLS	Unified Medical Language System	The UMLS integrates and distributes key terminology, classification and coding standards, and associated resources to promote creation of more effective and interoperable biomedical information systems and services, including electronic health records
VDH	Virginia Department of Health	The Commonwealth of Virginia's Health Department
VHEN	Virginia Health Exchange Network	A collaboration of Virginia health plans and systems dedicated to lowering administrative costs in healthcare convened by the Virginia Association of Health Plans (VAHP), The Virginia Hospital and Healthcare Association (VHHA), and the Governor's Office if Health IT.
VHIT REC	Virginia HIT Regional Extension Center	The organization offering technical assistance, guidance and information on best practices to support and accelerate health care providers' efforts to become meaningful users of electronic health records (EHRs) in Virginia
VIIS	Virginia Immunization Information System	Statewide immunization registry that contains immunization data of persons of all ages
VLER	Veteran Lifetime Electronic Record	Military personnel record that will transition with them from active to veteran status
XDS	Cross-Enterprise Document Sharing	Facilitates the registration, distribution and access across health enterprises of patient electronic health records